USSR
ELECTRONIC AND PRECISION EQUIPMENT

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I. ITEMS OF SPECIAL INTEREST

A. Development-Production Gap Criticized

There is too large a gap between development and industrial production of instruments in the USSR. This gap amounts to 4-7 years in the USSR and only 1-2 years in the US. The small M-3 computer, for instance, was designed 4 years ago. Its first models were built in 1956 and are still operating successfully. However, the question of putting this machine into series production has been under consideration by Gosplan (State Planning Commission) USSR for about a year. -- A. Blagonravov, Academician, and V. Semkov (Moscow, Izvestiya, 14 May 58)

B. Space Flight Commentary

The development of atomic energy, industrial automation, and electronic mathematical machines and the improvement of geological exploration methods are all linked to the achievements of modern radio engineering. Along with the glorious Soviet border troops, radar installations keep sharp watch over the peace of our homeland. The time will come when automatically radio-controlled rockets will reach interplanetary space. And then, when man fulfills his proud dream and sets forth on his first trip into the cosmos, radio will be his reliable helper and means of communicating with his native planet. (Baku, Bakinskiy Rabochiy, 7 May 58)

There is not a single area of our lives, not a single branch of daily activity of a Soviet man, where radio is not used. New branches of sciences and technology have arisen because of radio. These include radioastronomy, radio aeronavigation, radio motion-picture equipment, radar, radiometrology, and electronic computers. We are all deeply confident that it will not be long before a radio-controlled rocket will fly from Soviet soil to the moon.

At present more than 33 million radio receiving devices are in operation in the USSR. More than 2.5 million television sets are in operation. -- V. Nuzhnyy, Deputy Chairman, Committee for Radiobroadcasting and Television of the Council of Ministers Ukrainian SSR (Kiev, Pravda Ukrainy, 7 May 58)

C. Miniaturization Urged

The heavy weight of the Soviet artificial satellites is a great achievement of our rocketry specialists, who were able to develop powerful engines capable of thrusting a heavy load beyond the confines of the ionosphere and to impart a high speed to it to place it into orbit. But these vast achievements should be matched by the low weight of measuring and radio apparatus. While the achievements of rocketry specialists are appraised according to the development of large and powerful rockets, the

successes of radio engineers should be appraised according to the ability to create minute, yet highly precise, sensitive, and reliable special electronic instruments.

Miniaturization and even subminiaturization is one of the greatest tasks facing radio engineering during the era of artificial earth satellites. Miniaturization should apply to all components of radio equipment, including receiver and transmitter power supplies, and coding devices. This can be achieved by the use of transistors, printed circuits, and other devices, but the methods for miniaturization are far from exhausted. Our radio amateurs should participate in the solution of these problems.

Miniaturization is the problem of the efficient use of the volume and weight of artificial satellites. An ordinary satellite equipped with high-capacity power sources and extra-light and economical apparatus will send signals for months, not merely weeks.

Miniaturization in earth satellites can also be achieved by the use of semiconductors to convert solar energy into electric current for charging batteries and for direct supply of power to instruments. Why can't radio amateurs try to make this dream a reality?

Miniature radio equipment is needed for purposes other than satellites. Why should a television set weigh tens of kilograms? Why must its volume be several tenths of a cubic meter? The only essential thing for the television audience is the size of the screen. The ideal television set should be as flat as a picture. -- A. L. Mints, Corresponding Member of the Academy of Sciences USSR

(Source contains further information on the use of meteors and rockets for the scatter propagation of radio waves.) (Moscow, Komsomol'skaya Pravda, 7 May 58)

D. New Plants in Armenia

The Armenian Sovnarkhoz (Council of National Economy) has adopted a resolution concerning the organization of new plants for the manufacture of electrical products, instruments, and automation equipment.

A miniature electric motor plant (zavod mikroelektrodvigateley) is being developed in Leninakan in the building of a former bed factory. This enterprise will produce 300,000 motors per year. By the end of 1958, it is expected to produce an experimental consignment of these motors.

A precision industrial jewels plant is being organized in Akhtinskiy Rayon, in the former workers settlement for the construction of the Arzniges [Arzni Hydroelectric Power Station]. Its products will be used in the timepiece and instrument making industries.

A powder metallurgy plant is being developed in Yerevan. It will manufacture 15 million electrometalloceramic products and 200 tons of permanent magnets per year.

A plant for the production of glass electric insulating materials for th cable and electrical industries will be put into operation in the settlement of Tsakhkunk, Akhtinskiy Rayon.

A plant for the production of performing mechanisms is to be organized in Sevan, in the premises of the machine shop of an industrial combine. These mechanisms will be used for the automation of industrial processes in various branches of industry.

It is planned to open a plant for the production of small precision machine tools for the timepiece and instrument industries in Kirovakan.

It has also been resolved to organize a number of shops. A shop for the production of external parts and the assembly of wrist watches will be organized at the Yerevan Timepiece Plant. A shop for the production of ceramic parts for electrical installation products and other products is to be organized under the Administration of Construction Materials Industry. (Yerevan, Kommunist, 14 May 58)

E. First Lithuanian-Made Radio-Phonograph

Workers, engineers, and technicians of Kaunas enterprises of the Administration of Instrument Making, Lithuanian Sovnarkhoz, have finished testing experimental models of the first Lithuanian-made radio-phonograph, the Dayna. It consists of a record player and a four-band radio receiver.

The series production of the new radio-phonograph will begin in the third quarter of 1958. (Vil'nyus, Sovetskaya Litva, 8 May 58)

[Comment: No mention of facilities for the production of radio equipment in Kaunas has been noted previously in the Soviet press.]

F. Civilian Radio Parts Used for Making Instruments

The Leningrad Institute of Water Transport Engineers has developed the IG-8 ultrasonic pulse generator for the prevention of scale-formation in boilers.

For making instruments of this type, the transformer of the Riga-6 radio receiver or the power transformer of the VEF-Akkord (M-255) radio receiver was used. (Moscow, Promyshlennaya Energetika, Sep 58, pp 5-6)

[Comment: It is not clear from the original whether the transformers were spare parts or were removed from the receivers, but in view of the generally poor spare-parts supply situation in the USSR, it is probable that the radios themselves were used for parts.]

G. Machine for Making Thin Capacitor Paper

The Leningrad Machine Building Plant imeni Vtoraya Pyatiletka has built a special machine for the manufacture of thin capacitor paper, which is used in the production of radio receivers and television sets. This machine has been installed in the Kommunar Factory and the work performed by it has been found to be very good. (Moscow, Lesnaya Promyshlennost', 1 Jul 58)

H. Personalities

M. Lesechko [formerly Minister of Instrument Building and Automation Equipment] is a deputy chairman of Gosplan Ukrainian SSR. (Moscow, Pravda, 12 May 58)

V. P. Lukin [formerly Deputy Minister of Instrument Building and Automation Equipment] is the chief of a division of Gosplan RSFSR. (Moscow, Promyshlenno-Ekonomicheskaya Gazeta, 14 May 58)

D. S. Chernichkin [formerly Deputy Minister of Electrical Engineering Industry USSR] is chief of the Division of Electrical Industry and Instrument Making of Gosplan USSR. (Moscow, Trud, 8 May 58)

A. I. Shokin [formerly First Deputy Minister of Radio Engineering Industry USSR] is deputy chairman of the State Committee for Radioelectronics of the Council of Ministers USSR. (Moscow, Trud, 8 May 58)

II. CONSUMER GOODS SHORTAGES

A. Batteries

[Comment: The following articles throw an interesting light on what appears to be an acute shortage of storage and dry-cell batteries in the USSR. Complaints about the shortage of batteries for consumer items have been appearing in Soviet publications for several months, and have been increasing in volume.

The steps to alleviate the shortage do not seem to offer any hope of additional allotment of batteries for consumer purposes. Instead, they embody the redesigning of equipment to cut down the requirements for batteries.

It is noteworthy that the Soviets consider transistorization, the utilization of semiconductor converters, and the design of circuit-fed flash lamps to be preferable to any method of making more batteries available.]

The editorial board of the journal Radio receives many letters from readers asking where batteries for Rodina, Iskra, and Turist radio receivers may be obtained, and why the USSR radio industry does not produce voltage converters utilizing transistors. They also want to know when the partly transistorized Sputnik and Kristall radios, about which so much has been written, will go on sale. Consequently, members of the editorial board decided to interview the representatives of various organizations and departments concerned with the production of apparatus for kolkhoz villages.

The first interview was an impromptu one in the Moscow GUM department store. A customer who was examining shiny, smartly finished Turist receivers stated regretfully: "It's a nice toy, but it wears down right away. In our village, this receiver doesn't work more than 2 weeks. The battery dies down and the receiver stops playing. You can then search over hell and high water but you won't find a new battery."

A. V. Filippova, manager of the cultural goods department of the GUM, affirmed that batteries for Turist radios were hardly ever on sale. "When spare batteries are on sale, the Turist radios are in great demand; on such days the store sells 25-30 of these radios, but on other days no more than 5-8 are sold."

On the same day, interviews in stores dealing in radio products disclosed that batteries for either portable or stationary radio receivers are one of the most scarce commodities and that battery production absolutely does not meet the demand.

If the USSR battery cell industry cannot ensure a steady supply of batteries for the great number of battery sets already in operation, undoubtedly the supply situation will become worse in the future.

However, according to D. S. Chernichkin, chief of the Division of Electrical Engineering and Instrument Making Industry of Gosplan USSR, the situation will improve. The production of batteries in USSR plants is being expanded day by day. Automatic lines are being put into operation and manufacturing methods are being improved. But it must be stated outright that the time for radical changes in the production of battery receivers has arrived.

Transistors should replace vacuum tubes in battery sets. Thus the sets could be supplied easily by many various low-voltage power sources. The high economic qualities of transistor receivers and amplifiers will make them cheaper to operate and will give the national economy great savings.

As far as existing vacuum tube receivers are concerned, the use of semiconductor voltage converters for supplying their plate circuits would greatly facilitate the task of providing power sources, since the production of the low-voltage batteries that would be used does not necessitate consumption of the scarce and costly materials which have to be used for making high-voltage batteries. One of these materials, high-quality manganese peroxide, does not have to be used in low-voltage batteries since the oxygen of the atmosphere is used as a depolarizer.

In Chernichkin's words, "The organization of the production of transistor battery receivers and the mass production of transistor voltage converters for vacuum tube sets are a timely way to solve the problem of power supply for battery equipment, and a fully realistic way from the technical point of view.

A. S. Severov, chief engineer of the administration of the Ministry of Communications USSR that is charged with rural radiofication, stated that 2 years ago, his administration placed an order with industry and scientific research institutes for the development of transistorized equipment for rural areas. At present, the KRU-40 transistorized wired-radio unit, The RDPK-30 transistorized remote-controlled equipment, and fully and partly transistorized broadcast receivers are under development. The question of developing a transistorized ultrashort-wave receiver is being put up for consideration.

The demand for transistor apparatus for rural purposes is extremely great. All battery-supplied vacuum tube wired-radio units, several thousands of which are in operation, should be replaced by transistorized units. In the near future, transistorized radio receivers should fully replace battery-supplied vacuum tube sets.

According to V. S. Kefeli, chief engineer of the Voronezh Radio Plant, the high labor and material expenditures in the production of high-voltage batteries have made it necessary for his plant to develop a new economical receiver, the Rodina. The Rodina, a 1958 production model, is a partly transistorized superheterodyne model utilizing miniature tubes and transistors. The cost of a set of batteries for supplying this receiver is 54 rubles, as compared with 81 rubles for batteries to supply the Rodina-52 radio receiver. In addition, the service life of the batteries is considerably longer.

In 1957, the plant produced an experimental consignment of Voronezh portable receivers, which are superheterodyne sets utilizing nine type P6 transistors.

In Kefeli's words: "Our experience shows that industry is capable of undertaking the series production of transistor apparatus." Representatives of other plants agreed with this statement.

Is it possible in the very near future to begin the series production of transistor receivers, wired-radio units, and voltage converters? This question was placed before the State Committee for Radioelectronics of the Council of Ministers USSR.

V. A. Govyadinov, chief of the committee's Technical Administration, gave the following reply:

"Practical conditions for organizing the mass production of transistor apparatus now exist. Industry can fully satisfy the demand for transistors, not only in variety, but in the quantity needed for ensuring the production of the first series of transistor receivers and wired-radio units in 1959.

"The institutes of our committee have developed all the transistors necessary for radiobroadcast equipment and have also developed models of receivers and wired-radio units which are suitable for series production.

"Since the production of transistors will be increased sharply year by year, it is necessary to accelerate the introduction of transistorized equipment so that the [transistor] industry will be able to sell its products. Newly designed battery equipment cannot be considered modern if at least partial use of transistors is not made in it. Thus, the utilization of transistors in the audio-frequency circuits of all battery receivers should be made compulsory from now on.

"What is hindering the initiation of large-scale production of transistorized equipment at present? Often it is the result of sluggishness, a 'fear' of new technology. This affliction is especially prevalent at plants which have been engaged in the production of vacuum tube apparatus

for a long time. These plants do not hurry to reorganize production, and if they do master the production of transistorized equipment, they do it extremely slowly and limit themselves to small-series or exhibition models."

Many interesting comments were heard from the representatives of various organizations and departments on the future of transistors. Only the representatives of sovnarkhozes, (councils of national economy) where radio plants have begun the series production of transistorized equipment were not heard from. Readers of Radio are most interested in the statements of these representatives. We believe that such statements will appear before long in our journal.

Now that the problem of series-producing transistors has been solved, the main part in organizing the production of transistor receivers and wired-radio units will have to be played by the sovnarkhozes, especially those that have plants producing vacuum-tube apparatus for rural radiofication.

At the same time, the sovnarkhozes, especially those with well-developed radio industries, would do well to organize the production of transistors. Gosplan (State Planning Commission) USSR and the State Committee for Radioelectronics should give them substantial practical aid in mastering new technology.

It is unfortunate that many sovnarkhozes have displayed intolerable sluggishness in mastering the production of transistorized equipment. For example, why couldn't the enterprises of the Latvian Sovnarkhoz have organized the production of a partly transistorized receiver based on the Turist portable radio? The radio plants of the Leningradskiy, Voronezhskiy, Vladimirsky, and other sovnarkhozes are fully capable of producing transistor receivers, amplifiers, and voltage converters. (Moscow, Radio, Aug 58, pp 16-17)

Many professional and amateur photographers of Leningrad have purchased Molniya electronic flash units and have used them very successfully insofar as they have been able to obtain batteries for them. However, for several months now it has been impossible to obtain these batteries, and this leaves the photographer with an electronic flash unit which he cannot use. (Moscow, Sovetskoye Foto, Jul 58, p 85)

The pulse light-source laboratory of the Moscow Electric Bulb Plant is developing a new photographic flash lamp, which will be supplied with power from regular city lighting circuits, instead of from batteries or dry cells. It will be less expensive than battery-powered flash lamps. (Moscow, Leninskoye Znamya, 27 Apr 58)

[Comment: This may be an answer to recent complaints about the shortage of batteries for powering flash lamps.]

B. Components

The Moscow Hearing-Aid Equipment Plant (Moskovskiy zavod slukhovykh apparatov), which recently went into operation, is supposed to produce 15,000 hearing aids in 1958. However, by June 1958, it had produced only an experimental consignment.

This failure is due to the fact that hearing aids are actually complex precision instruments utilizing a microphone, a telephone, an amplifier, a volume control, a battery, and other miniature components which the plant itself does not produce, but is supposed to receive from other plants on a cooperative supply basis.

At the end of 1957, Gosplan RSFSR ordered the Leningradskiy Sovnarkhoz to include the production of 100,000 hearing-aid batteries in the 1958 plan of the Leninskaya Iskra Plant. The production of these batteries was to have begun during the first quarter of 1958, but F. A. Prokopenko, plant director, failed to heed the order and the batteries are still unavailable. The Novosibirskiy Sovnarkhoz failed to supply other parts for the hearing aids.

The State Committee for Radioelectronics of the Council of Ministers USSR has long delayed the supply of electrolytic capacitors.

The Moscow Optical Machinery Plant has failed to organize the production of finished mountings for the hearing aids. N. K. Lomakin, director of this plant, has it produce only rough-finished mountings. What would it cost this plant, which produces 2.5 million eyeglass mountings per year, to manufacture 12,000 finished mountings for hearing aids at the same time? The Moscow Hearing-Aid Equipment Plant has had to organize a special department for finishing mountings.

As a result of all of this, the Moscow Hearing-Aid Equipment Plant does not manufacture finished products, but only accumulates unfinished hearing aids in its storeroom. (Moscow, Ogonek, No 37, Sep 58, p 27)

It is very difficult for owners of television sets to have their sets repaired because of the shortage of spare parts.

According to Reznikov, chief engineer of the [Moscow] Radio Plant, his plant has stopped production of the Temp-2 television set and does not make any more spare parts for it.

The L'vov Electric Bulb Plant fails to supply sufficient cathode-ray tubes because it has such a high reject rate. Pozunyak is deputy director of the plant.

Gerchikov, manager of the L'vov Interoblast Office of Glavradiosbyt [Main Administration for Sales of the Radio Engineering Industry] says that his office cannot sell cathode-ray tubes to individuals. He is backed up in his stand by Smolin, chief of Glavradiosbyt, who says that his organization is an office and only distributes, but does not sell.

The Aleksandrov [Radio] Plant of the Vladimirskiy Sovnarkhoz refuses to produce parts for KVN-49 television sets, although more than a million such sets are in use in the USSR.

Television sets with only three channels are being shipped to cities where the only television stations will be on channels 4 and 5. (Moscow, Promyshlenno-Ekonomicheskaya Gazeta, 9 Mar 58)

According to M. Khrunichev, deputy chairman of Gosplan USSR, Gosplan USSR, the Council of Ministers RSFSR, and the Council of Ministers Ukrainian SSR have developed measures to permit additional production of 35LK2B and 40LK1B cathode-ray tubes, and the demand for these tubes will be completely satisfied. The sovnarkhozes concerned have been asked to provide spare parts for the repair of television sets to television workshops of the Ministry of Communications.

F. Kudlay, director of the L'vov Electric Bulb Plant, states that his enterprise will continue its work on reducing rejects and increasing production of television picture tubes. S. Trifonov, Deputy Minister of Trade USSR, states that in Order No 069, dated 26 March 1958, trade organizations were advised not to permit the shipment of three-channel television sets to cities and rayons where they cannot be used. (Moscow, Promyshlenno-Ekonomicheskaya Gazeta, 9 May 58)

On June 1958, I bought a Rekord television set in Lugansk. It is a beautiful set, but it stands unused because I cannot get a cable for connecting the antenna. The plant which manufactures the set informed me that it does not produce the cables. I could not get cable through the All-Union Mail Order House. I would like to ask the oblast trade administration why television sets are sold in the stores in an incomplete state which precludes their being used by the purchaser. -- I. Rogov (Moscow, Komsomol'skaya Pravda, 18 Jul 58)

C. Photographic Supplies

The photography enthusiast finds in literature frequent references to filters, particularly blue filters, as aids to obtaining the desired photographic effect. However, it is impossible for the enthusiast to acquire these filters, since they are not produced by our industry. (Moscow, Sovetskoye Foto, Aug 58, pp 83-84)

Rural photography enthusiasts are unfortunately not always able to follow the good advice given in photography publications with respect to developing and fixing solutions, since the chemicals required are frequently not available in the stores. Even ordinary developer and such things as metol and hydroquinone are unavailable. -- Ya. Lyuft, Pavlodarskaya Oblast, Kazakh SSR

Prepared developers do not always prove satisfactory to either professional or amateur photographers. However, such ingredients as metol, hydroquinine, amidol, and others are seldom available to the rural photographer. The supply of such things to rural communities should be established through the All-Union Mail Order Office. -- M. Poltoran, Mogilevskaya Oblast, Belorussian SSR (Moscow, Sovetskoye Foto, May 58, pp 85-86)

All during the winter and spring [of 1958) there has been no film available in Lugansk. Besides, there have been no filters available for FED and Zorkiy cameras, no auxiliary lenses, lenses for enlargers, photographic paper, or color film. It is also very difficult to get chemicals such as metol, hydroquinone, and potash, which are not available in the stores. (Moscow, Sovetskoye Foto, Jul 58, p 86)

The stores of our city (Kirovsk, Murmanskaya Oblast) have neither film nor paper for color photography, and only one of the chemical ingredients, sodium sulfide, is available for purchase. Nor does it do any good to turn to the All-Union Mail Order Office, which more often than not simply returns the money. (Moscow, Sovetskoye Foto, Aug 58, p 84)

III. LOCAL PRODUCTION AND ORGANIZATION

A cybernetics section of the Khar'kov Palace of Sciences was organized 4 months ago. More than 80 scientific workers, instructors of higher educational institutions, engineers, and workers of Khar'kov plants are participating actively in the work of this section.

In addition to lectures and discussions, this section is doing practical work. It is helping the [Khar'kov Radio] Plant imeni Shevchenko to automate production processes, and has begun the development of cybernetic apparatuses for the deaf and blind. (Khar'kov, Sotsialistychna Kharkivshchyna, 24 Jan 58)

Since the organization of the Leningradskiy Sovnarkhoz, (Council of National Economy), enterprises of the Leningrad economic region have developed hundreds of types of new machines, machine tools, and instruments and have put them into production. Among these are electrical measuring and optical instruments and complex radio and electronic products. Our enterprises also made their contributions to the peaceful use of atomic energy and the launching of artificial earth satellites both before and after the reorganization of industry.

During the first quarter of 1958, the gross output of Leningrad industry rose 10 percent over the equivalent 1957 period. In certain branches of industry, the gains were even higher. For instance, output of the instrument-making industry rose 20 percent, and that of the radio engineering industry, 34 percent over the first quarter of 1957. -- A. Bobrov, Deputy Chairman, Leningradskiy Sovnarkhoz [former Deputy Minister of Radio Engineering Industry USSR] (Leningradskaya Pravda, 30 Apr 58)

According to L. I. Kozlovskiy, chief of the Administration of the Instrument Making Industry of the Leningradskiy Sovnarkhoz, plants of his administration are putting new types and models of instruments and apparatus into production in 1958; many are already in production. The Leningrad Lenteplopribor Plant has produced its first series of electronic automatic instruments with induction transmitters. They can be used for measuring the level of any liquids, and for measuring temperatures in addition. They will be put into large-scale use in many branches of industry.

The Leningrad Vibrator Electrical Measuring Instrument Plant is producing new types of eight-channel oscillographs, which record on film and paper and are used for registering test processes.

The Leningrad Computer Machine Building Plant has begun the development of operational-accounting computers utilizing electromechanical components.

The Leningrad Kinap Plant is producing an amplifier unit for stereophonic film sound reproduction.

Other instrument plants are developing important instruments. Leningrad plants will produce a total of 130 new types and models of instruments and apparatus during 1958. (Leningradskaya Pravda, 8 May 58)

In the 4 months ending 30 April 1958, enterprises of the Leningradskiy Sovnarkhoz produced 8,000 power circuit breakers, power transformers with a total capacity of 63,000 kw, 2,340 units of welding equipment, 574 X-ray installations, 1,848 km of armored cable, 2,356 km of marine cable, 233,000 cameras, 465,000 timepieces, and 94,000 radio receivers and television sets.

The above-listed figures represented slight percentage increases over the equivalent 1957 period, with the exception of a 191-percent increase for power transformers and a 112-percent increase for timepieces. (Leningradskaya Pravda, 13 May 58)

Zil'bersheyd is chief technologist of the Administration of Electrical Engineering Industry, Moscow City Sovnarkhoz. (Moscow, Moskovskaya Pravda, 15 May 58)

The following plants, recipients of awards in the socialist competion for the first quarter of 1958, are subordinate to the Moscow Oblast Sovnarkhoz: Podol'sk Battery Plant, Podol'sk Cable Plant, Mytishchi Electric Meter Plant, Klin Laborpribor [Laboratory Instrument] Plant, and Kuntsevo KIM Platinum Needle Plant. (Moscow, Krasnoye Znamya, 29 Apr 58)

During the 4 months ending 30 April 1958, industry located in the Latvian SSR produced 815 sets of train-lighting equipment, 52 sets of electrical equipment for multisection motorcar trains, 2,335 sets of electrical equipment for lift trucks, 167,800 radio receivers, and automatic telephone exchanges with a total number capacity of 45,200. (Riga, Sovetskaya Latviya, 15 May 58)

In the 4 months ending 30 April 1958, enterprises of the Lithuanian SSR produced 3,168 welding units, 5,075 welding transformers, and 515,000 electric meters. (Vil'nyus, Sovetskaya Litva, 14 May 58)

In 1956, 124,400 radio receivers and television sets were produced in the Belorussian SSR. In 1940, only 400 radio receivers were produced in Belorussia. (Minsk, Sovetskaya Belorussiya, 26 Apr 58)

IV. ANNIVERSARY SPEECHES AND ARTICLES

A. Radio Day

Radio has become indispensable in industry, transport, astronomy, aviation, and atomic technology. During the past 15 years, more than ten independent branches of science and technology have stemmed from radio. All of these comprise the broad field of science called radioelectronics.

In the past year, Soviet specialists have made important contributions to the development of radio engineering and electronics. They have designed instruments for controlling rockets and for guiding earth satellites into predetermined orbits. Apparatus and power sources for providing reliable transmission of radio signals from the satellites to the earth have been built.

Through the efforts of Soviet radio specialists, USSR civil airliners have been equipped with modern radio-navigational devices.

In the past year, the application of radioelectronics in many branches of the national economy has been expanded. Much work has been done in the improvement of communications and broadcasting equipment. New equipment, exceeding the level of world technology in some aspects, is being introduced in the radiofication of the country. Miniature apparatus is being used along with large installations. Recently, a transistor conversation unit for translating speeches was developed. It is of pocket size and weighs only 250 grams. The battery serves reliably for more than 100 hours. Such apparatus is very convenient for use at international conferences. In 1957, it served reliably at the Sixth Festival of Youth and Students in Moscow and at the sessions of the International Electrical Engineering Commission.

Dozens of television centers have been put into operation; the network of radio relay lines is growing. On 30 April 1958, the Moscow-Yaroslavl'- Ivanovo radio relay line was put into operation. Standard studio equipment is being produced. An improved mobile three-room television station has been designed.

A number of new television receivers have been developed. Certain types of these are on the level of world technology with regard to number of channels and picture stability and quality. The sharpness and semitones of these receivers have been improved by using picture tubes with contrast glass and aluminized screens and by the introduction of frequency-phase correction.

The employment of television for industrial purposes is being expanded in transport, metallurgical enterprises, scientific research, medicine, and other fields. Apparatus for underwater observation has been produced. A

special camera enclosed in a bathysphere sends signals to the surface, where they are converted into images on a screen. New units for industry have also been developed.

Research on color television conducted by Moscow and Leningrad institutes has shown positive results. A system that can be used interchangeably with black-and-white has been accepted. The task of scientists and engineers working in this field is now to make color television available to the broad masses of the workers in coming years.

The successes of Soviet radioelectronics are indisputable. However, in accordance with the tradition that has arisen in our country on Radio Day, specialists are concentrating their attention on the unsolved problems connected with the development of radio engineering.

Radio relay lines are being installed slowly, just as they were in 1957. Enterprises of the radio engineering industry are delaying the production of multichannel apparatus because of these lines. The special vacuum tubes for radio relay lines do not satisfy the requirements either for quality or for service life. The Ministry of Communications is late in constructing new important lines.

The development of a network of ultrashort-wave stations is also unsatisfactory. An insufficient quantity of many types of wide-band apparatus is being produced.

The reject rate in vacuum tube production is very great. At certain enterprises, it has reached alarming proportions. Even picture tubes have not escaped this fate. Through the fault of the Elektrostal' Plant, the L'vov Electric Bulb Plant was forced to produce cathode-ray tubes out of metal of the worst quality.

There is not enough research on ferrite materials. Work in this field is done by various groups, which often duplicate each other's work. It is necessary to join forces in the production of ferrites and to create large enterprises with a scientific center to coordinate their activities. This center could be a special design bureau with a high-capacity production base or it could be an all-union institute.

The tasks envisioned by the 7-year plan require an expansion of the research and production base of the radio engineering industry. This is necessary, not only for raising the capacity of broadcast stations, communications equipment, and television broadcasting, but also for increasing production of the latest radioelectronic devices for the entire national economy. The planned rates require a sharp increase in the production of electronic tubes, semiconductor products, and miniature radio components

and the development of new instruments and equipment. This goal can be attained if the lag in the automation of industrial processes, especially in assembly and adjusting operations, can be eliminated. (Moscow, Promyshlenno-Ekonomicheskaya Gazeta, 7 May 58)

In a pre-Radio Day interview by a correspondent of Leningradskaya Pravda, K. Kh. Murav'yev, chief of the Institute of Communications imeni M. A. Bonch-Bruyevich, made the following statements on the achievements of modern radio engineering:

"Thanks to the great attention and care of the party and the government, radio has penetrated into all spheres of human activity in a very short time. In our days, there is no branch of the national economy where radio engineering and electronics are not used on a large scale. The development of radio engineering has opened new specialized fields for the utilization of radio, such as radio communications, radiobroadcasting, radar, radio navigation, industrial electronics, and finally, television.

"Radar, which was most rapidly developed during World War II, is an important means of defense. Radar equipment substantially increases the effectiveness of the weapons of the Soviet Army. Special devices make it possible, not only to detect certain objects, but also to determine their coordinates with the necessary accuracy.

"Radio navigation instruments help ships to sail complex channels and airplanes to make blind landings. They control artificial earth satellites and guide ballistics rockets into the desired points in space. These are merely a few of the problems solved by radio navigational equipment.

"The use of electronics has opened new possibilities in the development of science. It can be said without exaggeration that the most important achievements of nuclear physics in our fatherland and the development of powerful machines, such as the cyclotron and synchrophasatron, were made possible only on the basis of utilizing electronics.

"The development of radio engineering brought into existence such new branches of sciences as radioastronomy and radiospectroscopy and have helped to improve time service, etc.

"The close collaboration between radio physicists and engineers has made it possible to penetrate deeper into the secrets of the structure of solid matter and to use the knowledge gained thereby for the further

development of radio engineering. Here, we must mention semiconductor devices, which are replacing electron tubes, quantum amplifiers and generators, and devices operating in so-called 'superconductivity' systems.

"Solid state physics has enabled our scientists to use millimetric and submillimetric waves in radio engineering. Previously, the generation and amplification of such signals was very difficult. The utilization of millimetric and submillimetric waves makes it possible to transmit many television programs simultaneously, to solve the radiovision problems of objects, etc.

"Our institute is closely tied to many scientific research institutes and enterprises of Leningrad, Moscow, Novosibirsk, and other large centers. By means of our joint efforts, we are carrying on scientific research that is important to the national economy. In particular, the laboratories of the institute are engaged in improving a color television system, long-distance radio relay communications without intermediate stations, electronic computers, etc.

"Our main task is to train highly skilled engineers for the Soviet radio engineering industry." (Leningradskaya Pravda, 6 May 58)

At present, radioelectronics has a powerful industrial and scientific research base in the USSR. Several score institutes and design organizations work in this field. Radio plants produce a great variety of radioelectronic equipment. In 1957 alone, more than 4 million radio-broadcast receivers and television sets, many millions of radio tubes, 800 million resistors and capacitors, and thousands of radio transmitters of various powers were produced. In addition, the radio industry produced a large quantity of other radioelectronic equipment necessary for the national economy and defense of the country.

From 1948 to 1957, the total volume of industrial production in the USSR was more than quadrupled. During the same time, the production of radioelectronic equipment was increased to nearly 18 times the 1948 level. This rate of development of the radio industry will be maintained in the future, since the demand for radio products increases continuously and the sphere of application of such products is expanding.

About 35 million radio-receiving points are in operation in the USSR. Each year, the radio industry produces millions of new radio receivers of various classes, ranging from 3-4-tube sets to multitube high-fidelity receivers.

Radar and radio navigation are now used on a large scale in air and sea communications. Radar methods make it possible, with the least expense, to solve a number of important problems in geology, astronomy, and a number of other fields where electromagnetic radiation can do the work of "explorers."

About 2 million television sets are in operation in the largest cities of the USSR. In the near future, the radio industry should increase the production of television equipment to a level sufficient for the development of television broadcasting over the entire European USSR and the thickly populated regions of Siberia, the Soviet Far East, and Central Asia. By 1965, it is intended to have more than 300 television centers in operation and a network of television receivers capable of bringing television broadcasts to about 100 million persons.

The use of television in industry is becoming more and more widespread. It is the task of the radio industry to sharply increase the production of such television systems and to effect a maximum reduction in their costs.

The number of simultaneous radio communications transmissions is limited by the frequency bands suitable for this purpose. With the existing equipment, radio broadcasts have already exhausted the long-, medium-, short-, and ultrashort-wave bands. A significant quantity of radio equipment is operating on superhigh frequencies. However, superhigh frequency is limited both in number of available channels and in effective utilization for long-distance communications. It is the task of scientists and engineers to develop methods for the more economical utilization of radio channels through the application of the information theory. In addition, all possible efforts must be expended to eliminate interference and to increase transmission ranges through the utilization of tropospheric, ionospheric, and meteoric scatter propagation of radio waves.

Methods for transmitting high-frequency energy over wave guides are of great importance in increasing the number of communications channels. By using wave-guide communications lines, it is possible to transmit simultaneously several television programs and thousands of telephone conversations. The development of a single automatic system of telephone communications in the USSR by connecting the largest cities with wave-guide lines will enable the residents of these cities to make long-distance calls just as easily as local calls. Radioelectronic apparatus for wave-guide line transmission should be developed by our scientific research and design organizations in the coming years.

The problem of equipment reliability has acquired great importance. This is understandable since present-day complex radioelectronic systems consist of a large quantity of tubes, semiconductors, and miniature components. The problem of reliability is of great importance to the further development of radioelectronics.

One of the important components of electronic apparatus is the electron tube with the heated cathode. Modern technology does not have the means to accurately determine the service life of electron tubes; thus, in most cases these tubes break down suddenly and disrupt the operation

of entire systems. Semiconductors are superior to tubes in this respect. The theoretical service life of semiconductors is considerably greater than that of vacuum tubes; in addition, semiconductors have greater mechanical stability.

In recent years, great efforts have been expended in the development of semiconductors capable of replacing vacuum tubes. Many types of semiconductor rectifiers and amplifiers have been developed and are produced on an industrial scale. It is expected that in the near future, a rapid process of replacing low-power vacuum tubes with semiconductors in most products of the radioelectronic industry will take place.

An important advantage of semiconductors is their small size. However, this small size can be taken full advantage of only when miniature components, such as capacitors, resistors, transformers, and inductances, can be used. The production of such components requires the use of new high-quality insulation and magnetic materials, new types of electric wire, and other materials.

The radio engineering industry has many complaints against the chemical, electrical, metallurgical, and other industries with regard to obtaining the latest electrical, high-frequency, and semiconductor materials. The work in the field of new materials of these industries does not ensure the necessary rate of improvement of radioelectronic equipment.

One task which should be solved by Soviet engineers in the near future is the automation of the control and servicing of complex radioelectronic equipment used for broadcasting, communications, navigation, scientific research, and defense. It is important that unattended radio stations, relay points, wire-broadcasting units, and other installations be developed which will be remote-controlled by wire or radio.

The large-scale introduction in science and industry of electronic control machines built on the basis of mathematical control theory makes it possible to progress from the automation of individual units to the over-all automation of entire plants, communications systems, and navigational and other equipment.

The immediate task of the sovnarkhozes of economic regions where large radio plants are located is the introduction of high-production methods and the production of apparatus for mass use. -- V. Kalmykov, Chairman, State Committee for Radioelectronics, Council of Ministers USSR (Moscow, Pravda, 7 May 58)

For a long time, the Soviet people have been waiting impatiently for the advent of color television. Many difficulties and delays have been encountered in working on this problem. Now, however, most of the difficulties are behind us and color television will soon become firmly embedded

in our lives. A group of workers, under the leadership of P. Shmakov, Leningrad professor, has developed a color television system which gives high-quality images in color and black and white.

Great tasks await our radio industry, which is producing radiobroadcast equipment. It should develop reliable portable radios with various power supplies more rapidly and in greater quantity, so that people will be able to listen to radio in even the most remote part of the USSR. So far, our radio industry has not coped satisfactorily with this task. -- V. Siforov, Corresponding Member, Academy of Sciences USSR (Moscow, Sovetskaya Rossiya, 7 May 58)

In the past decade, radio engineering has advanced considerably. The USSR now has a broad scientific research network encompassing all problems of radio engineering and possesses the most powerful radio centers, radiotelescopes, and radar in the world.

In 2 years, 38 million radio points will be in operation in the USSR. The number of radio receivers will be more than five times that of 1955.

Radio relay lines are becoming increasingly important. These wireless lines make it possible simultaneously to transmit television programs between cities and to establish multichannel and long-distance telegraph and telephone communications.

Aircraft are being used for relaying television programs between major USSR cities, such as Leningrad and Moscow. -- Z. U. Sokolov, Deputy Chairman, State Committee for Radiobroadcasting and Television, Council of Ministers USSR (Moscow, Trud, 6 May 58)

In a number of cases, the radio engineering industry is lagging in the production of modern, handy equipment and does not fully satisfy all needs of the national economy. This lag must be overcome in as short a time as possible. The production of vacuum tubes and semiconductor devices and components must be expanded by all possible means. The designs of components must be improved, and large-scale use should be made of printed circuits. (Moscow, Izvestiya, 7 May 58)

B. Anniversary of Nizhni-Novgorod Radio Laboratory

From 22 to 24 May 1958, a conference dedicated to the 40th anniversary of the Nizhni-Novgorod Radio Laboratory imeni Lenin was held in Gor'kiy. The conference was organized by the Gor'kiy branch of the Scientific and Technical Society of Radio Engineering and Electrical Communications imeni A. S. Popov.

A. I. Shokin, a speaker at the conference, described the development of the radio engineering industry. He stated that the 1957 output of the radio engineering industry was 18 times that of 1948, while the output of USSR industry as a whole during the same period merely quadrupled. The Soviet radio engineering industry is one of the world leaders in its field, and its volume of production is second only to that of the US.

In 1957, the USSR radio engineering industry mastered the series production of 450 type-designations of products, and in 1958, it will begin the production of 600 type-designations.

The vacuum tube industry produces about 1,500 types of electron tubes, including modern superhigh-frequency devices. It produces high-power and super-power magnetrons and klystrons, traveling wave tubes for amplifying power and voltage, carcinotrons, photoelectron multipliers, image converter tubes, special types of receiving and transmitting cathode-ray tubes, kinescopes, high-power oscillator triodes, tetrodes, pentodes, and other tubes.

Included among the more than 200 types of receiver-amplifier tubes produced by industry are high-transconductance tubes, long-service life tubes, high-stability tubes, and heavy-duty tubes [literally: tubes with high mechanical strength].

More than 110 million vacuum tubes are produced annually in the USSR. Tens of millions of semiconductors of various types have been developed and are in production. Semiconductors are being used on a large scale in newly developed radio engineering and electronic devices. Special plants for the production of radio components have been organized or are in the process of organization. These plants utilize constant-flow production methods in which mechanization of industrial processes and automation of control processes are applied on a broad scale. For example, a specialized radio components enterprise produces about 3 million resistors and capacitors per year.

Since 1922, the USSR has been one of the world leaders, and the leader in Europe, with regard to the power of its transmitters. It has developed 500-kw short-wave transmitters —— the most powerful short-wave transmitters in the world. It has developed a 200-kw, nation-wide (magistral'nyy), radio-communications transmitter. Industry is beginning the production of medium-wave, short-wave, and ultrashort-wave transmitters with automatic controls both for broadcast and communications purposes.

The impending production by industry of new ultrashort-wave FM, completely automated stations will make economical multiprogram broadcasting possible in thickly populated areas of the USSR.

From 1945 to 1957, about 18.5 million radio receivers were produced. Ferrite antennas, selenium rectifiers, two separate tone controls, and keyboard tone controls have been used in high-class receivers. New types of three-speed record players and tape recorders are used in radio-phonographs. Printed circuits, transformers with ribbon-wound cores, and germanium diodes have been used on a large scale in mass-produced receivers.

In 1957, the development of new television equipment using unified circuit and design elements was begun, in connection with the extensive plans for the construction of new television centers. The new equipment includes that of a small television center with four camera channels for cities originating their own programs and that of an 18-camera-channel television center for providing single-program television broadcasts consisting of studio and film transmissions and transmissions from mobile stations, radio relay lines, and various types of projectors and transmitters.

A multiprogram television center is being developed for central television broadcasts. It is possible in this center to broadcast simultaneously three television programs, one of which can be in color. Much work is being conducted in the development of new types of cathode-ray tubes and other vacuum tubes for color television.

A new mobile television station has been developed. This station is mounted in a single motor bus and has a long service radius. Its picture quality has been improved, and it can provide for operations on four radio lines.

In 1958, development will begin of a mobile motor-vehicle-mounted reporting installation, which is designed for live television transmissions from a moving car and can transmit video and audio signals to a mobile television station, which relays them to the television center. The operating range of this installation is 5 km.

A portable reporting television installation designed for live television transmissions has been designed. The design of this installation enables the reporting announcer to carry out operations up to 500 meters from the mobile television station and to communicate with the mobile television station over a radio line. The transmitter of this radio line is contained in a knapsack, and the portable transmitting camera is held in the reporter's hand.

In 1958, about one million television sets will be produced. The new sets will be distinguished by their higher sensitivity (20-40 microvolts), high selectivity, and economic-operating qualities (110-160-watt input).

Automatic brightness controls, automatic phase characteristic controls, automatic gain controls, and automatic alignment of line synchronizing frequency have been introduced in some of them. Some of the sets have two- and three-channel high-fidelity sound systems and remote tuning. Models of television sets have been developed which have cathode ray with deflection angles of 110 degrees.

An all-transistor television set using about 12 watts' input power is on display at the Brussels Fair. The USSR is the only country demonstrating such a television set.

Industrial television installations with cameras that can be remotely controlled at distances up to 1,000 meters are being produced. Underwater television installations for undersea research, for underwater installations, and for rescue work have been developed.

The rapid development of the aircraft industry has necessitated the development of a large quantity of various radio devices and systems for local and long-distance navigational purposes, for flight safety purposes, and for landing aircraft under adverse weather conditions.

A great achievement of the Soviet radio engineering industry is the development of a number of models of radioelectronic equipment for elementary particle accelerators, which are used in nuclear research. These developments were crowned by the creation of single-design radio equipment for the 10-Bev synchrophasotron, the most powerful in the world. Work is going on in the development of complex radio equipment for an even more powerful charged-particles accelerator. A large quantity of special radiometric and dosimeteric apparatus for facilitating a broad scope of research in the peaceful use of atomic and thermonuclear energy and in the use of radioactive isotopes in production has been developed or is now under development.

The important tasks in the field of radio-measuring equipment have necessitated the creation of a special branch of industry with scientific research institutes and a number of plants and design bureaus. In 1958, more than 190 types of radio-measuring instruments are in series production and more than 30 new models are in experimental production. More than 100 instruments are in the developmental stage. Substantial scientific research work is being conducted in solving the problems of developing instruments with higher precision, of finding methods for implementing the latest achievements of radio engineering and radiophysics radio-measuring equipment, of mastering new wave bands, and of raising operational stability and reliability.

The large-scale utilization of radioactive isotopes for controlling production processes, for precision measurements, and for scientific research became possible only after the development of a large number of

types of radio-measuring instruments and the organization of their series production. Many special alloys and steels are melted in vacuum furnaces. The control of these furnaces was made possible only after the development of vacuum meters, leak detectors, and other instruments. A number of branches of industry have photoelectronic automatic systems, which are used for automatic control, sorting, and counting of products in the machine building, metallurgical, and food industries. Photoelectric pyrometers have become necessary instruments for measuring temperatures in smelting and rolling operations.

The continuously increasing use of radioelectronic equipment in the national economy and in defense has necessitated a large-scale expansion of the production base of the Soviet radio engineering industry. At present, constant-flow methods of organizing production have come into large-scale use. By the beginning of 1957, the assembly of radio receivers, television sets, telephone sets, and relays for mass use was put on constant-flow conveyer lines. As a result, the output of radio products in 1956 was increased to six times the 1950 level, although the number of workers in the industry was increased to only 2.8 times the 1950 level.

One of the latest trends in the production and design of radio-electronic apparatus is the use of printed circuits.

In the conclusion of his lecture, A. I. Shokin quoted from several American specialists to illustrate the growing authority of Soviet radio engineering in the world.

A testament to the new successes of USSR radioelectronics and the USSR radio engineering industry is the third Soviet earth satellite. There are several thousand semiconductor devices on this satellite alone. The most important component parts of its scientific equipment are photo-electron multipliers, which are used for studying cosmic rays and the corpuscular radiation of the sun; piezoelectric transmitters for studying micrometeorites; and semiconductor solar batteries.

A multichannel radiometric system with high resolution capacity has been installed on the satellite. This system constantly registers scientific measurements obtained during flight, stores the data of these measurements, and transmits them back to the earth.

The satellite has several high-power transmitting units. Almost all of the special apparatus for scientific research has electronic units. The apparatus is controlled by an electronic time-program unit and commutating instruments giving time signals for coordinating measurement data with astronomic time and geographic coordinates.

A special time service equipped with radio apparatus has been organized [in the USSR]. The results of observations are processed by high-speed computers. Electronic-optical converters, which greatly increase the effectiveness of observations, are used for photographic methods of observation.

At the same conference, Ya. M. Sorin mentioned that the first germanium triode was developed in the USSR in 1949. In 1953, the series production of several types of semiconductors was begun. However, copper-oxide and selenium rectifiers for various voltages and currents were put into production in the 1920's and are still being used and produced. (Moscow, Radiotekhnika, Aug 58, pp 72-75)

V. ELECTRONIC EQUIPMENT

A. Research and Development

A scientific and technical conference on radio receivers was held at the IRPA (Institute of Radiobroadcast Reception and Acoustics) in Leningrad. Representatives of scientific research institutes and plants of the radio engineering industry, the Ministry of Communications and its scientific research institutes, and a number of other organizations and departments participated.

The conference appraised the results of the operations of the radio engineering industry and of institutes in the design and production of radio receiving equipment and outlined ways for the further development of this branch of radio engineering.

As a result of work done by leading institutes and plants in 1955-1956, new types of radio receivers and radio-phonographs with ultrashort-wave bands, higher fidelity, and improved external designs were developed and put into mass production. The utilization of unified parts and subassemblies was one of the main features in their designs.

Radiobroadcast receivers should be further improved during the next 5-7 years by improving the basic electrical characteristics of the ultrashort-wave channel (lowering spurious emission and increasing selectivity and sensitivity) and of the ultralow-frequency channel (expanding the band of effectively reproduced frequencies and lowering the coefficient of nonlinear distortion) and by raising operational reliability and lowering production costs.

New receivers should be designed with attention given to the use of step regulators of the frequency characteristic shape in the ultralow-frequency channels; of two- and three-channel amplifiers; of transformerless outputs; and of transistors.

To improve acoustics, systems of stereophonic (obyemnyy) sound and extension emitters should be used on a wide scale. Receiver designs should be suited to the large-scale use of automated production methods.

Designers have been given the highly important task of developing simplified inexpensive receivers and radio-phonographs with ultrashort-wave bands for mass use. The improvement of battery receivers should be directed mainly toward making them more economical to operate.

Along with the improvement of radio receiver quality, it is necessary to improve the quality of ultrashort-wave broadcasting, since at present the advantages of this band are not fully exploited.

The conference paid much attention to the problems of utilizing semiconductors. At present, intensive work is being done on semiconductors to raise their frequency bands, output powers, and operating temperatures and to decrease set noise. Diffusion semiconductors, which are superior to the semiconductors used at present, have been developed and put into experimental production.

A number of lectures at the conference were devoted to the problems of using semiconductors in radiobroadcast equipment.

The conference heard and discussed lectures on the problem of developing new, highly effective power sources, improvement of receivers and receiver subassemblies, and improvement of manufacturing methods.

The conference outlined the basic methods for improving radiobroadcast receivers so that they will conform as far as possible to the present-day level of development of radio engineering and the radio engineering industry. (Moscow, Vestnik Svyazi, Jul 58, pp 34-35)

The MTFL [Moscow Television Branch Laboratory] and the IRPA [Institute of Radiobroadcast Reception and Acoustics] are now under the GKRE [State Committee for Radioelectronics of the Council of Ministers]. (Moscow, Tekhnika Kino i Televideniya, Sep 58, p 87)

The OKB EVP [Special Design Bureau of the Electrovacuum Industry?] has been doing research on the types LI-7 and LI-17 television transmitting camera tubes. (Moscow, Tekhnika Kino i Televideniya, Sep 58, p 87)

The IRPA gives consultations on radiobroadcasting and electroacoustical equipment produced by the enterprises of the radio engineering industry. Its address is Leningrad, post office box 414.

The IRPA and other organizations giving written answers to radio amateurs do not repair equipment, ship components, or send out literature on radio. Only the proper trade organizations should be consulted in these matters. (Moscow, Radio, Aug 58, p 64)

B. Transistors

More than 10 years have passed since the first articles on transistors appeared in popular science journals. The small sizes, low-power requirements, high economical qualities, and practically unlimited service life of transistors immediately drew the attention of radio specialists and radio amateurs.

At first, however, many of these specialists and amateurs, who had become accustomed to electron tubes, considered semiconductors another 20th Century fad. This skepticism resulted in part from the small size of the transistors, and from the fact that more artiales about transistors themselves.

Soon after the development of laboratory models, various types of transistors began coming off plant lines, and even the most uncompromising skeptics began to realize that a serious competitor to the vacuum tube had been created.

At first, the wide-scale use of transistors in industrial apparatus was hindered by a number of serious defects, especially the great dispersal of their characteristics and their low threshold frequency.

Credit must be given to USSR industry in that the quality of transistors was sharply improved in a short time. Completely modern transistors with sufficiently stable parameters have replaced the deficient series P1, P2, and P3 transistors. Production has begun of diffusion and surface-barrier transistors, which operate satisfactorily on high frequencies up to the ultrashort-wave band.

The production of transistors is being sharply increased; transistors not only have appeared on the shelves of city stores, but also listed for sale by the Soyuzposyltorg [All-Union Mail Order Office].

Transistors are being put into use in more and more fields. They are now used in computers, long-distance communications equipment, and many control and measuring instruments.

The advantages of transistorization are best illustrated in battery-supplied apparatus, especially in receivers and amplifiers designed for rural radiofication. There is a great future for using thermoelectric generators and solar batteries for supplying transistor receivers and amplifiers.

From a technical point of view, the problem of creating transistorized equipment for rural radiofication has long been solved. For several years, transistor receivers have been exhibited at the All-Union Industrial Exposition. Wired-radio units 40-120 watts in power have been developed and readied for production. A television set, utilizing all transistors except for the picture tube is exhibited at the Brussels Fair.

In view of all this, it is completely incomprehensible why the series production of transistorized apparatus is being delayed. Years go by, and rural radio listeners encounter transistors only on the pages of popular science journals.

Rather than wait, some rural radiofication workers, such as those at the Krimskaya Oblast Radio Center, are building their own transistorized apparatus. The equipment made by these workers is far from perfect, but their primitive hand-made equipment constitutes a reprimand to the radio engineering industry, especially to those plants which long ago could have started producing transistorized equipment for rural areas.

The capabilities of the USSR radio industry are enormous, a fact attested to by the ability of many radio plants to organize the mass production of modern television sets and radio receivers in a short time. For this reason there is no doubt that the series production of transistorized equipment for rural radiofication could be organized in a very short time. It is time to change over from exhibition pieces to series-produced equipment. (Moscow, Radio, Aug 58, pp 16-17)

C. Transmitters

Although the technical level of USSR radio transmitters in such parameters as power per unit, operational reliability, and operational versatility in switching over to various wave lengths is somewhat higher than that of foreign-made models, they are inferior to some of the latter in many other aspects.

The area occupied by USSR transmitters is from 1.5 to 2 times as great as that occupied by similar transmitters made by foreign firms. The level of development of automatics and telemechanics is still low.

USSR industry is not putting enough effort into the development of high-power air-cooled oscillator tubes; for this reason, USSR transmitters over 5 kw in power utilize water cooling, which increases expenditures in the construction of radio stations and complicates their operation.

The types LI-7 and LI-17 television transmitting tubes are not produced in sufficient quantity and are not always of high quality. Types 40LK1B and 43LK2B kinescopes are also produced in insufficient quantity, and their quality is not always satisfactory.

This is all especially regrettable in connection with the shining accomplishments of our science and technology, as attested to by the launching of the third Soviet earth satellite, an event which showed that the USSR is substantially ahead of the US. The extremely complex radioelectronic installations comprising the basic equipment of the earth satellite were made by our radio industry on the highest level of modern technology.

There is no doubt that under the leadership of the Communist Party our radio industry will eliminate the deficiencies in the mass production of certain types of radio engineering equipment in the near future. -- A. Kakunin, Deputy Minister of Communications USSR (Moscow, Radio, Jul 58, pp 9-10)

D. Radio and Television

1. General Information

The USSR industry has developed modern high-quality television sets and radio receivers. The Riga VEF Plant has finished developing the high-class Kristall radio-phonograph; the Riga Plant imeni Popov has developed the Class-1 Sakta radio-phonograph. Both of these sets will be put into industrial production in 1958. So-called "radio combines," consisting of a radio receiver, a television receiver, a record player, an automatic record changer, and a tape recorder, have been developed and will go on sale in 1959.

Soon the first experimental color television station will go into operation in Moscow.

A number of long-wave and medium-wave receivers based on available transistors have been developed. Their industrial production and sale are to begin in 1959.

Recently, the development of a wired-radio system utilizing transistors and receiving power and sending signals over telephone lines was completed. This unit, with a power of 120 watts, needs no service personnel. The production of the equipment for these units will begin in 1959. (Moscow, Komsomol'skaya Pravda, 7 May 58)

The Riga VEF Plant has developed a "radio combine," which consists of a radio receiver, a record player, and a Melodiya-type double-track tape recorder. Another combine made by a Moscow plant and exhibited at the Brussels fair consists of a radio receiver, a record player, a tape recorder, and a television set.

The Institute of Radiobroadcast Reception and Acoustics has developed models of two-band radio receivers in which vacuum tubes have been replaced by transistors. These receivers weigh from 800 to 3,500 grams and are much cheaper to operate than similar radios designed for operation in rural areas.

One of the plants of the Vladimirskiy Sovnarkhoz (Council of National Economy) has produced an all-transistor car radio. (Moscow, Izvestiya, 7 May 58)

In 1960, the sale of radio receivers to the population should be increased to 2.2 times the 1955 level and the sale of television sets to five times the 1955 level. -- G. Ionin, Deputy Chairman, Committee for Radiobroadcasting and Television, Council of Ministers Kirgiz SSR (Frunze, Sovetskaya Kirgiziya, 7 May 58)

2. Prices

The Novosibirsk Base of Posyltorg [All-Union Mail Order Office] has the following articles for sale:

	Price (rubles)
Ural Class-2 six-tube radio-phonograph with antenna No 2	1,132
Oktava seven-tube five-band radio-phonograph with internal magnetic antenna, automatic volume control, tone control, four dynamic loud-speakers, and antenna No 2	1,656
Baltika Class-2 loud-speaker for wired-radio systems	98
Voronezh Class-3, five-tube radio receiver with dry cell set and antenna No 1	438
Rodina-52 Class-2 seven-tube battery radio with dry cell set and antenna No 1	662
Iskra Class-3 four-tube battery radio with dry cell set and antenna No 1	412

The above-listed prices include shipping costs. -- Advertisement (Khabarovsk, Tikhookeanskaya Pravda, 10 Apr 58)

The following retail prices were quoted in the prize list of a lottery for the Belorussian SSR (in rubles):

Belarus'-3 television set	2,300
Belarus'-57 radio receiver	1,350
R-57 radio-phonograph	1,070
Druzhba radio-phonograph	2,300

(Minsk, supplement to Sovetskaya Belorussiya, 5 May 58)

The retail prices for the following articles were quoted in the prize list of a lottery for the Kazakh SSR (in rubles):

Irtysh radio-phonograph	1,100
Yauza tape recorder	1,800
Estoniya radio-phonograph	2,200
Rekord television set	1,850
Lyuks or Druzhba radio-phonograph	2,300
El'fa 6-1M tape recorder-phonograph	900
Temp-3 television set	2,500

(Alma-Ata, Kazakhstanskaya Pravda, 7 May 58)

The following retail prices were given in the prize list of a lottery for the Armenian SSR (in rubles):

Luch-1 television set	1,400
Baltika radio receiver	765

(Yerevan, supplement to Kommunist, 10 May 58)

The following retail prices were quoted in the prize list of a lottery for the Moldavian SSR (in rubles)

UP-2 record player	350
Irtysh or Daugava radio-phonograph	1,100
Druzhba or Lyuks radio-phonograph	2,300
Dnepr tape recorder	1,500
Avangard television set	1,600

(Kishinev, supplement to Sovetskaya Moldaviya, 15 May 58)

3. Radio Receivers

The Murom Radio Plant and the Leningrad Institute of Radio-broadcast Reception and Acoustics have developed the KRU-40 (1), the first industrial production model of an all-transistor wired-radio unit. The KRU-40 is designed for operation in nonelectrified areas or in small settlements without continuously operating power networks.

The KRU-40 has an output of 40 watts, which is sufficient for supplying 200-400 radio points. Its efficiency is about 60 percent, which is 2.5 times the efficiency of equivalent vacuum-tube units. The set is supplied by a 24-volt storage battery, which can be charged by a wind generator or from an AC network. It can also be used as a terminal amplifier installation, supplied from a rayon center over telephone wires. In this case, the receiver can be used for receiving programs on a frequency of 31.5 kilocycles, which is also transmitted over telephone wires. Remote-controlled KRU-40 units can be installed within a radius of 20-25 km of a rayon center.

The KRU-40 receives programs in kilocycle ranges of 150-415, 520-600, 3,950-6,250, 9,500-9,775, and 11,700-11,975 and can be used for local broadcasts. Its input power is no greater than .2 watt at a voltage of 12 volts. (Moscow, Radio, Aug 58, p 19)

(1) Photo available in source, p 19, bottom.

The newly developed KRU-40 kolkhoz wired-radio unit has a sensitivity of 2 millivolts at the microphone input, .5 volt at the [phonograph] pickup, and .775 millivolt at the receiver and connector line.

Its band width is 100-5,000 cycles. Nonlinear distortion does not exceed 8 percent and the frequency characteristic distortion does not exceed 5 decibels.

The unit is powered by 24-26-volt storage batteries, and has an average input of 1.5 amp. It measures 510 x 300 x 280 mm and weighs 25 kg. (Moscow, Vestnik Svyazi, Aug 58, inside front cover)

Designers and technologists of the Riga VEF Plant and the Riga Plant imeni Popov have been developing new models of radio receivers. The Plant imeni Popov has put the high-class Festival' receiver into production. Recently, the VEF Plant has developed and produced models of a series of modern radios and radio-phonographs, including the Kristall, Rubin, and Almaz, a total of 28 variants. The radio-phonographs have automatic record players and tape recorders.

The Scientific Research Institute of Radiobroadcast Reception and Acoustics and a number of plants have developed models of miniature transistor radio receivers. One such receiver is the Festival', which receives medium waves, weights 800 grams, and is of the size and shape of a note pad. The Sverdlovsk, Syurpriz, and Voskhod receivers have up to seven transistors and internal power sources. An interesting model is the miniature Sputnik transistor radio, which contains four tiny zinc-cadmium batteries and, in addition, can be powered by a solar battery. (Riga, Sovetskaya Latviya, 6 May 58)

The Malysh transistor radio has been developed in Leningrad. It is of the same size as a cigar case. It utilizes transistors instead of tubes and the extra-fine lines of conductive elements have replaced the wires that crowd the insides of ordinary receivers. (Leningradskaya Pravda, 30 Apr 58)

On 6 May 1958, the 250,000th Ogonek radio receiver came off the conveyer of the Moscow Krasnyy Oktyabr Plant. (Moscow, Moskovskaya Pravda, 7 May 58)

4. Combination Sets

The Dnepropetrovsk Radio Plant has produced its first consignment of Yubileynyy combination sets. These consist of a Vesna seven-tube radio, a Rekord television set, a Dnepr tape recorder, and a record player. This combination weighs hardly more than 50 kg and is housed in a cabinet about 1.1 meter in height. It was developed by Dermidontov, chief of the plant's experimental shop. (Kiev, Pravda Ukrainy, 17 Jun 58)

The Kazan'-57 portable radio-phonograph is designed for the reception of long-wave and medium-wave stations, for playing records, and for operation with MP-1 and MP-2 tape-recorder attachments.

The receiver of this unit is a four-tube superheterodyne with fixed tuning to seven different stations: three in the long-wave band and four in the medium-wave band.

The rated output of the set is at least one watt. Its sensitivity at a 50-milliwatt output is about 500 microvolts, and its sensitivity at the pickup socket is 250 millivolts. It is supplied by a 127- or 220-volt AC circuit.

During the second half of 1958, the plant [unidentified] will begin the production of such radio-phonographs, based on printed circuits made by the chemical precipitation method.

(Source gives detailed information and sketches.) (Moscow, Radio, Jul 58, pp 25-26)

The [Riga] VEF Plant of the Latvian Sovnarkhoz has developed a new class-1 small table-model radio-phonograph, the Latviya (2). This set has 11 miniature tubes and receives programs on the long-wave and medium-wave bands, and three short-wave bands, and the ultra-short-wave band. The set has four speakers. It has an output of 4 watts, and an input of 90 watts for radio reception and 110 watts for phonograph operation. (Moscow, Vestnik Svyazi, Sep 58, inside front cover)

(2) Photo available in source, inside front cover, top, left

5. Television Sets

The All-Union scientific Research Institute of Television has produced the PTU-4 industrial television unit, which is designed for the sequential observation of five industrial processes at distances up to one kilometer from the control panel. The set is being adjusted before being sent to the consumer who ordered it. (Leningrad, Vecherniy Leningrad, 27 May 58)

The Moscow Television Laboratory has developed a television set which utilizes transistors instead of tubes, except for the picture tube. Where the ordinary set requires at least 100 watts input, the transistor set requires only 12 watts. (Moscow, Leninskoye Znamya, 22 Jun 58)

The USSR radio industry has developed the five-channel Znamya-58 television set, utilizing a type 43LK2B rectangular picture tube and 19 miniature tubes. In addition to television broadcasts, it can receive ultrashort-wave FM programs. Its sensitivity is at least 200 microvolts. Its picture measures 255 x 340 mm.

This set, which has two speakers, has an input power of 140 watts, weighs 28 kg, and measures 510 x 480 x 470 mm. (Moscow, Vestnik Svyazi, Sep 58, inside front cover)

In 1958, enterprises of the Moscow City Sovnarkhoz will produce the new Temp-4 and Rubin-2 television sets, which have 315 x 420 mm screens and improved acoustical systems. Measures are being taken to increase the production of Temp-3 television sets, which were recently put into production. -- P. Borodin, Deputy Chairman, Moscow City Sovnarkhoz (Moscow, Moskovskaya Pravda, 11 May 58)

The Rubin television set (3), which is produced by the Moscow Television Equipment Plant, is very popular both in the USSR and abroad. Thousands of these sets have been installed in residences of Moscow, Leningrad, Kiev, Khar'kov, and Sverdlovsk and in the cities of Poland, Czechoslovakia, Bulgaria, Rumania, and other countries.

The latest model, the Rubin-102, is being exhibited at the Brussels Fair. The plant is getting ready for its series production. (Moscow, Pravda, 7 May 58)

(3) Photo, showing the tuning of a Rubin television chassis at the Moscow Television Equipment Plant, available in source, p 2

The series production of the Moskva projection-type television set began recently [at the Moscow Television Equipment Plant]. (Kishinev, Sovetskaya Moldaviya, 8 May 58)

The Avangard-55 is the basic product type of the Krasnoyarsk Television Plant. This enterprise has already produced about 55,000 television sets. (Moscow, Trud, 4 May 58)

6. Tape Recorders

The first consignment of a new tape recorder, the Akkord, has been produced in Saratov. The Akkord is only half the size of the Dnepr tape recorder, and has a tape speed of 95 mm per second, which makes it possible to double the duration of recording on an ordinary standard reel. It has two speakers and a high-speed rewinding mechanism.

Designers made large-scale use of plastics in the development of this recorder. (Moscow, Sovetskaya Torgovlya, 26 Jul 58)

7. Plant Information

The Tula Radio Plant progressed from a workshop to an industrial artel, and then to an enterprise equipped with automatic and mechanized equipment. It now specializes in the production of small but complex electroacoustic equipment. It has begun the production of type TM-1 small telephones for conference rooms, type 10TDN-1 loud-speakers, and MD-46 microphones. Its equipment is being exhibited and used at the Brussels Fair.

Plant workers under the leadership of Engineers Perepelitsa and Freydman have developed the MD-57 class-1 microphone, which is superior to currently produced types.

Engineers Malakhov, Aveyev, Kudryavtsev, and others have designed an original instrument for the automatic control of acoustic parameters on automatic communications lines, and an instrument for the visual observation of the frequency characteristics of products. (Moscow, Promyshlenno-Ekonomicheskaya Gazeta, 11 May 58)

The total 1957 volume of production at the Riga Radio Plant imeni Popov was 93 times as high as in 1945, and its production of radio receivers was more than 225 times as high.

Recently the plant has achieved great success in the production of radiobroadcast equipment. This achievement was made possible mainly by the Central Laboratory, where new methods are developed for solving problems by considering all USSR and foreign achievements in the field.

The plant continually tries to make the best possible sets at the lowest possible cost. Many sets developed by it from 1946 to 1949 were very popular. These include the T-689 nine-tube radio receiver, the

T-755 Class-3 low-price radio receiver, and the B-912 two-tube battery receiver. Later it began to produce the improved Riga-6 and Riga-10 radio receivers.

In fall 1955, the plant began the series production of the Daugava Class-2 radio-phonograph, which was the first USSR-made set with keyboard band switches.

Recently the plant designed and mastered the Festival' high-class radio, an original design utilizing remote control. This set has high-fidelity sound, a built-in ferrite antenna, transistors, miniature subassemblies, automatic frequency control, an ultrashort-wave unit, and miniature tubes. Remote switching to any of its seven bands, station tuning, and on-and-off switching can be done at distances up to 6-7 meters.

The plant laboratory and technical division are developing the Sakta Class-2 radio-phonograph, which utilizes printed circuits. It is also planned to develop the Festival' radio receiver in a console model with a new pickup and a smaller record player.

According to the long-range plan for the development of the national economy for 1959-1965, it is intended to concentrate the production of radio receivers wholly at the Plant imeni Popov and to approximately double the production of receivers in the Latvian SSR by 1965. (Moscow, Radio, Jul 58, p 11)

On 16 April 1918, the Supreme Council of the National Economy resolved to organize the First State Electrical Engineering Plant [now known as the Moscow Order of Lenin Radio Plant]. In 1926, this plant became the first USSR enterprise to undertake the series production of radio equipment. It began with the series production of Rekord loudspeakers and P-6 crystal receivers. Later, as the plant expanded its capacity and trained its workers, it began the large-series production of SI-235 vacuum-tube radio receivers and many other types of radio equipment for the national economy.

During World War II, the plant converted to the production of equipment for the Soviet Army. In 1945, it was awarded the Order of Lenin and was given the right to hold permanently the banner of the State Committee for Defense.

After the war, the plant developed and began the large-series production of the Rodina battery receivers. Rodina and Moskvich radio receivers produced by the plant are still very popular in the USSR. The first large-screen television sets, the Temp and Temp-2, which were put into large-series production at the plant, are very well known.

The plant places much emphasis on the development of technically competent, highly skilled personnel. The names of the radio specialists Kazanskiy, Vorontsov, Genishty, Glezerman, Nemtsov, Volkov, and others are well known at home and abroad.

Among the products of the plant displayed at the Brussels Fair were the Temp-3 and Temp-4 television sets and the Temp-5 combination set including television, radio, record player, and tape recorder. The fourth exhibit at the fair, the Nonna electrical musical instrument, was designed by Engineer A. Volodin.

At present the plant is developing new radio equipment and is readying it for production. This equipment includes new television receivers for color and black-and-white reception, which utilize printed circuits, semiconductors, ferrites, and band cores. In addition, many essentially new designs and manufacturing processes with high-production mechanisms are being used. -- A. Lichkov, Chief Engineer (Moscow, Radio, Jul 58, p 11)

The Aleksandrov Radio Plant was founded in 1932 on the base of radio workshops attached to the Moscow Main Post Office. Its operations began with the production of type Bulun low-power short-wave radio transmitters for the northern regions of the USSR. At that time, it also produced wave meters and amplifying equipment. In 1935-1936, it converted to the production of SVD9 and SVDM radio receivers and the SVGK radiophonograph, as well as of radiotelegraphic and wired-radio receivers.

Even in those years, mass production required high-quality operations. Much aid was given in this respect by the introduction of conveyer and constant-flow production methods. Before World War II, in addition to its series-produced equipment, the plant manufactured more than 250,000 all-wave superheterodyne receivers.

After World War II, the plant resumed the production of radio receivers. In 1946, it began the production of the Rekord radio receiver. In 3 years, the plant produced more than 500,000 of these receivers.

A new, improved type of radio receiver for mass use developed at the Aleksandrov plant was the ARZ table-model receiver. Production of this same receiver was also undertaken at other plants, and it was not taken off production until 1957. The Aleksandrov plant alone produced 800,000 such receivers in 3 years.

Later the Aleksandrov Radio Plant began the mass production of television sets. The Rekord, which it is now producing, is in great demand.

After the 20th Congress of the CPSU, the plant took a number of important measures for automating and mechanizing production. For example, it put all of its galvanizing operations on a constant-flow basis. The operations of the television assembly shop were completely reorganized. Various types of moving conveyers were put into operation in this shop. The adjustment operations on the Rekord television set were transferred to conveyers. This shop has a total conveyer length of 400 meters.

In April 1957, the plant began the production of the Rekord-2 television set, which has a better picture, uses 30 watts less power, and weighs 2 kg less than the old Rekord. In the fourth quarter of 1958, a 12-channel system PTP unit [an adapter for adding television channels] will be used in the Rekord-2.

Designers and engineers of the plant are developing a new type of television set, which will be put into production by the end of 1959. In 1959, the plant intends to double its production of new modern television sets. (Moscow, Radio, Aug 58, p 15)

E. Communication Equipment

USSR industry does not supply enough high-frequency apparatus for adding lines to communications trunk lines, semiautomatic long-distance apparatus, and standard switching equipment for long-distance telephone exchanges. In many very important aspects, this delays the conversion of channels to instantaneous operating systems and hampers the introduction of semiautomatic methods for making connections.

All is not well either with the production of individual apparatus subunits. For instance, the industry of the Leningradskiy Sovnarkhoz supplies long-distance semiautomatic apparatus without voice-frequency dialing receiver plates. The Ministry of Communications is forced to order these plates in other places, which delays putting the apparatus into operation. The Leningradskiy Sovnarkhoz, which has many well-equipped industrial enterprises at its disposal, could well organize the production of the plates and could thus supply apparatus without missing parts. (Moscow, Vestnik Svyazi, Jul 58, p 2)

To carry out automation and mechanization of communications, the scientific research institutes, design bureaus, and plants of the Ministry of Communications USSR and of the radio engineering industry should hasten, in all ways possible, the completion of a large number of highly important developments now under way. This applies especially to the development of equipment for automatic long-distance telephone communications, multichannel systems for adding lines to communications cable lines, multichannel radio relay lines, crossbar telephone exchanges for city and rayon telephone communications, high-speed telegraphic and phototelegraphic equipment, automatic transmitters and equipment for the automation of radio centers, automation equipment for wire-radio centers, automatic electrical feeder installations, and equipment for the automation of post office operations.

Plants of the Leningradskiy, Latvian, Permskiy, Dnepropetrovskiy, Rostovskiy, Kaluzhskiy, Tbilisi [Georgian], L'vovskiy, Tomskiy, Bashkirskiy, and Krasnoyarskiy sovnarkhozes should begin the series production of automation and mechanization equipment as soon as possible in quantities satisfying the needs of a growing communications network. (Moscow, Vestnik Svyazi, Sep 58, p 2)

The NIITS (Scientific Research Institute of Urban and Rural Telephone Communications), jointly with the [Leningrad] Krasnaya Zarya Plant, has developed an all-relay unit-type automatic telephone exchange with a capacity of 10-40 numbers for rural use. The exchange was put into experimental operation in January 1957 and has been found to be operationally reliable. (Moscow, Elektrosvyaz, Sep 58, p 62)

In the new Viktoriya telephone set, which is being readied for production at the Riga VEF Plant, all the brass gears have been replaced by plastic gears. This not only saves metal, but also makes the [dial] operation completely noiseless.

Many different metal parts produced in the plant's shops could be replaced by plastic, capron, and other synthetic materials. For example, telephone cords, which have silk-and-varnish windings, could be covered with polyamid film. This substitution, according to estimates, would save the plant more than one million rubles per year. However, the large-scale application of synthetics is limited by the shortage of such materials. (Riga, Sovetskaya Latviya, 15 May 58)

The first experimental set of telegraphic equipment with code switching (Liman) was developed in 1956 by the TsNIIS [Central Scientific Research Institute of Communications] and the Riga VEF Plant according to the specifications of the Ministry of Communications USSR. The Liman station was put into operational testing in the beginning of April 1957, and remained in operation until 15 September 1957. It was put back into operation on 25 October 1957, and remains in operation to this day.

The experience in operating the Liman automatic telegraphic relay station with code switching will provide the know-how for its future production and utilization. (Moscow, Vestnik Svyazi, Sep 58, pp 6, 8)

During the postwar years, many installations for the simultaneous interpretation of speeches were developed in the USSR. Such equipment has been developed by the MGRS [Moscow City Wired-Radio Network], the IRPA, the [Riga] VEF Plant, and other organizations. However, the capacity of such equipment is limited, since it can serve only a limited number of listeners.

In 1957, the MGRS produced portable simultaneous interpretation equipment for the Soviet delegation at the Cairo conference of Peace Partisans. Very simple interpretation units made by the MGRS were also used successfully at the conference of representatives of communist and workers parties in Moscow and at other conferences.

The MGRS interpretation units use amplifiers from the electrical megaphones made by the [german?] Paul Bauer firm. In similar units, amplifiers from USSR-made electric megaphones developed by the IRPA can be used. (Moscow, Vestnik Svyazi, Sep 58, p 14)

F. Light Bulbs

In November 1957, type KDSSh-1000 superhigh-pressure DC 1,000-watt globe-type xenon lamps were put into test operation at three projector posts of the Moscow Strela Motion-Picture Theater. These lamps were produced by the Moscow Electric Bulb Plant in accordance with the specifications of the NIKFI [Scientific Research Motion-Picture Photography Institute]. (Moscow, Kinomekhanik, Sep 58, p 22)

The Moscow Strela Theater is the first USSR motion-picture theater to be equipped with xenon lamps. (Moscow, Kinomekhanik, Sep 58, p 27)

The Yerevan Electric Bulb Plant has a spiral filament shop (4). The plant is producing fluorescent lamps. It has sent 30 workers to the L'vov Electric Bulb Plant and the Moscow Glass Plant to receive training and experience in the production of bulbs. (Yerevan, Kommunist, 26 Apr 58)

(4) Photo available in source. p 1

VI. PRECISION EQUIPMENT

A. Computers

The Moscow Scientific Research Institute of Computer Machine Building has developed a special computing device (5) for the precision regulation of the amount of electric power supplied to an electric furnace and for maintaining a set pattern of furnace operation. This device is of an all-transistor design, using semiconductor and magnetic components such as germanium triodes, silicon diodes, and thyrite carborundum resistors. The device is small and performs complex mathematical operations, including addition, multiplication, and integration, all at high speeds.

Knowing that the TN ISA(Tbilisi Institute of Instrument Making and Automation Equipment) is successfully working on the development of computers for the over-all automation of arc furnaces for melting ferrous metals, the Moscow institute has decided to send one model of this computing device to Tbilisi for the purpose of exchanging scientific and technical know-how. The Individual parts of this computer can be used as graphic models in specialized laboratories engaged in the development of new automation equipment. -- Ye. Radzivilov, Engineer, Moscow Scientific Research Institute of Computer Machine Building (Tbilisi, Zarya Vostoka, 8 May 58)

(5) Photo available in source, p 4, top

The small MN-M mathematical machine is on exhibit at the Soviet pavilion of the Brussels Fair. However, a new, improved, small electrical analog computer, the MN-10 has been developed.

V. B. Ushakov, chief designer for electrical simulation of the Scientific Research Institute of Computer Machine Building, states that the MN-10 was developed in the laboratory headed by G. M. Petrov, candidate of technical sciences. This machine is of an all-transistor design, the first such type in the world.

The small size of the portable MN-10 can be demonstrated by the fact that the MN-8, the largest Soviet computer, weighs almost 6,000 kg and occupies 60 square meters of floor space, while the MN-10 weighs only 45 kg and occupies as much floor space as a television set. The MN-10 uses the same amount of electricity as a light bulb.

The new computor carries out various mathematical operations, such as adding, division, multiplication, and integration, at high speeds. It is simple to operate, and looks more like a small table-model instrument or radio receiver rather than a machine. It has undergone a period of successful experimental operation, and may soon go on exhibit in Moscow. (Moscow, Moskovskaya Pravda, 17 May 58)

Soviet designers of electronic control computers are discovering new fields for their utilization. For example, in addition to developing machines for the programed control of metal-cutting machine tools and units, they are working on the utilization of electronic control computers in the electric melting of steel, in the controlling of blast furnace operations, and in the automatic control of electric trains, where strict adherance to schedule is required. -- V. Aleksandrov, Chief of a Design Bureau (Moscow, Radio, Jul 58, p 8)

The Scientific Research Institute of Computer Machine Building has developed the VPRR-2 computing device (6), which is used for determining cutting conditions in the turning, milling, and drilling of carbon, alloy, and heat-resistant steels and gray and malleable iron with hard-alloy and high-speed cutting tools.

The electrical circuit of this instrument is built up on the principle of utilizing potentiometers and does not have electron tubes.

The VPRR-2 operates on a 220-, 127-, or 36-volt circuit, and has an input power of 50 watts. It measures 645 x 305 x 440 mm and weighs 20 kg.

The instrument error is no greater than plus or minus 5 percent for all parameters.

(Source gives details on the operating principles of this device.) (Moscow, Stanki i Instrument, Aug 58, p 28)

(6) Photo available in source, p 28

B. Control and Regulation Equipment

The Problems Laboratory for the Over-all Mechanization and Automatization of Hoist and Transport Machines of the Moscow Higher Technical School imeni Bauman has developed a universal remote-control system.

It has recently tested a 2-ton electric overhead traveling crane with remote controls. A frequency method of remote control by radio is used for the transmitting device. This method, in contrast to the time-pulse method, is less sensitive to radio interference. The transmitting station, which weighs only 6 kg, is in a knapsack on the back of an operator. A portable control panel can be held by an operator in one hand.

A crane equipped with such controls can operate in accordance with a program recorded on magnetic tape. (Moscow, Sovetskaya Rossiya, 3 Jul 58)

The Institute of Precision Mechanics and Optics in Leningrad has finished making a working scale model of a dispatcher control panel for the press and forge shop of the Novo-Kramatorsk Machine Building Plant [Kramatorsk].

The new unit will enable a dispatcher to control and register production processes and to supervise workers. With the aid of special motion-picture projection devices, the dispatcher at any time can compare the actual process with the norm, and can take proper measures to correct it should there be any deviation. In addition, he can supervise the activities of crane operators and heating furnace workers with the use of light signals and radiotelephone communications. (Kiev, Pravda Ukrainy, 8 May 58)

The Institute of Automatics of Gosplan (State Planning Commission) Ukrainian SSR has developed a new type of multipoint electronic device for regulating the temperature of 2-17 furnaces simultaneously.

This device has an instrument panel on which the furnace temperatures are registered. Should temperatures deviate from the norm, the electronic device, through a special mechanism, automatically increases or decreases the feed of mazut or gas, and if necessary, of the air supply. The regulating system switches over from one furnace to another at set time intervals, and in this way maintains the correct temperature in several furnaces without any human intervention.

A device installed at the Kiev Glass Plant regulates the temperatures of six tunnel furnaces. A similar device used at the drying drums of the Semenovsko-Golovkovskaya Briquette Factory replaces 17 sets of ordinary regulating devices.

It is planned to organize the series production of multipoint electronic regulators in 1959. (Vil'nyus, Sovetskaya Litva, 8 May 58)

C. Instruments

The USSR is developing special instruments based on radiospectroscopic methods utilizing nuclear and electron resonance, and on activation analysis methods utilizing the irradiation of matter with neutrons. These instruments will be used for determining the composition of matter and the number of different elements therein.

The new instruments will be of exceptionally high importance, since they will permit the automation of a vast number of production processes, including those connected with prospecting for minerals. -- P. Mel'nik, Director, Institute of Automatics, Gosplan Ukrainian SSR (Moscow, Radio, Jul 58, p 7)

The Kazan' Teplokontrol' Plant has organized the mass production of type MT-60 industrial manometers, which are used in many different branches of the national economy. However, the plant does not have a closed production cycle in the manufacture of instruments. Comparatively

simple parts have to go through many operations on universal machine tools, and cause low labor productivity and insufficient precision. In addition, assembly processes are carried out manually; they amount to about 60 percent of all labor consumed in the production of pressure gauges.

After studying the situation at the plant, the All-Union Scientific Research Technological Institute of Instrument Making developed a plan for the mechanization and automation of manometer production. This plan will cut labor consumption for making manometers by one half, will cut their costs, and will raise their quality.

At present, the Tatarskiy Sovnarkhoz (Council of National Economy) has arranged for a number of machine building plants of the economic region to begin production of special machine tools and nonstandard equipment for the Teplokontrol' plant. (Moscow, Promyshlenno-Ekonomicheskaya Gazeta, 9 May 58)

The Moscow Energopribor Plant has produced the type REK-39 instrument (7) for the continuous determination and registration of the amount of oxygen in water used for feeding high-power steam boilers. (Moscow, Promyshlenno-Ekonomicheskaya Gazeta, 27 Apr 58)

(7) Photo available in source, p 1, bottom

A new instrument, the electromagnetic micrometer, has been developed in the laboratory for automation of production processes of the Institute of Machine Studies, Academy of Sciences Latvian SSR. This instrument can make instantaneous measurements of the thickness of galvanized coatings in the order of tens and hundreds of microns. Semiconductor components are used in the instrument. (Moscow, Leninskoye Znamya, 11 May 58)

In 1957, the [Yerevan] Instrument Making Plant was supposed to have received 40,000 sets of parts from the Pribor Plant of the L'vovskiy Sovnarkhoz, but instead received only 17,400 sets. (Moscow, Pravda, 8 May 58)

The INI-11 instrument (8) is designed for measuring the coefficient of nonlinear distortion in low-frequency radio installations. With the aid of its built-in vacuum-tube voltmeter, it is also possible to measure noise level and AC voltage.

The measurement of the coefficient of nonlinear distortions can be carried out within a range of .3 to 30 percent in a frequency band from 50 to 15,000 cycles. The measurement of noise level and AC voltage can be made from .03 to 300 volts in a band from 50 to 60,000 cycles.

The basic error in the measurement of the coefficient of nonlinear distortion does not exceed 5 percent of the upper limit of the scale.

The instrument is supplied from a 110-, 127-, or 220-volt 50-cycle circuit, or else from a 115-volt 400-cycle circuit, provided that the voltage of the circuit does not deviate more than plus or minus 10 percent.

The input power of the instrument is no greater than 150 volt-amperes. Its measurements are 340 x 310 x 600 mm, and its weight is 28 kg. It is produced by the industry of the Leningradskiy Sovnarkhoz. (Moscow, Vestnik Svyazi, Sep 58, inside front cover)

(8) Photo available in source, inside front cover, bottom, left

The type PIMEL instrument (9) is designed for measuring interelectrode capacities of radio tubes in a range from 10^{-4} to 50 micromicrofarads.

Instrument error does not exceed plus or minus 5 percent in measuring capacities from .0001 to .001 micromicrofarads; plus or minus 2 percent in measuring capacities from .001 to .1 micromicrofarads; and plus or minus one percent in measuring capacities from .1 to 50 micromicrofarads.

The indicator sensitivity is at least 300 microvolts.

The Instrument is supplied from a 110-, 127-, or 220-volt 50-cycle circuit, and has an input power of 60 watts.

The PIMEL instrument is produced by the industry of the Belorussian Sovnarkhoz. (Moscow, Vestnik Svyazi, Sep 58, inside front cover)

(9) Photo available in source, inside front cover, bottom, right

The All-Union Scientific Research Institute of Electrical Measuring Instruments of Glavniiproyekt [Main Administration for Planning Scientific Research Institutes?] of Gosplan USSR is announcing competitive examinations for the following vacant posts: chief of the Pointer Instrument Division and chief of the Resistance, Electronic, and Semiconductor Measuring Instrument Division.

Application should be made to the director of the institute at Petrovskaya naberezhnaya, 18, Leningrad P-46 before 24 January 1958. -- Advertisement (Leningrad, Vecherniy Leningrad, 28 Nov 57)

Birulis, deputy chief of the Administration of Instrument Building of the Lithuanian Sovnarkhoz, has informed the editorial board of Sovetskaya Litva that the Technical Council of the Vil'nyus Electric Meter Plant has resolved to send a group of specialists to the Leningrad Electrical Machinery Plant to acquire know-how in the production of aluminum indicator drums for electric meters.

The mass production of these drums will begin on 15 May 1958. (Vil'nyus, Sovetskaya Litva, 7 May 58)

The Leningrad Electrical Machinery Plant of Glavelektrotochpribor [Main Administration of Precision Electrical Instrument Building] is located at proyezd Stachek, 142-D, Leningrad. (Leningrad, Vecherniy Leningrad, 3 Dec 57)

Kochev is director of the Mytishchi Electric Meter Plant. Yeremenko is chief of the Administration of Electrical Engineering Industry of the Moscow Oblast Sovnarkhoz, which is in charge of the plant. (Moscow, Leninskoye Znamya, 6 May 58)

Recently, the first quartz chronometer ever to be installed in the Latvian SSR was put into operation at the Time Service of the Latvian State University imeni P. Stuchki. It is intended in the future to install two additional quartz chronometers, one of which will be made by scientific workers of the Time Service.

The determination of precision time is not the only purpose of the quartz chronometer. It is also used for frequency calibration. In Riga, where the radio engineering industry has been developed, a high-quality frequency standard is needed and the quartz chronometer serves this purpose. (Riga, Sovetskaya Latviya, 26 Apr 58)

The Kirov Physical Instruments Plant No 2 (Kirovskiy zavod fizicheskikh priborov No 2) produces apparatus for determining the heat value of engine fuels. (Moscow, Promyshlenno-Ekonomicheskaya Gazeta, 25 Apr 58)

A month ago, the Klin City Committee of the CPSU meted out a severe party reprimand to Bogomolov, director of the Klin Thermometer Plant: Shevelev, chief engineer: Kozlov, chief accountant: and other plant personnel, who had been inflating plant production figures to make it appear that the plan was being fulfilled. The plant has not fulfilled its plan for years. In 1957 alone, its losses amounted to 10 million rubles.

Bogomolov, plant director, also held the position of director of an independent design and technological bureau, which was also operated unsatisfactorily. When Petrov, chief of the experimental shop of the design bureau and a member of the Communist Party, attempted to bring about some reforms, he was transferred from the design bureau to another job. (Moscow, Leninskoye Znamya, 25 Apr 58)

D. X-Ray and Medical Apparatus

Products of the Aktyubinsk Aktyubrentgen Plant are shipped to all parts of the USSR and to Albania, Hungary, Poland, India, Afghanistan, and other countries. The plant undertakes the production of more and more new devices each year. In 1958, medical and industrial establishments will receive 3 million rubles' worth of products over the amount supplied in 1957. Teofil Anatol'yevich Kravchenko is chief designer of the plant.

Plant designers are developing a two-screen X-ray apparatus for surgical operations. They are thinking about developing an apparatus with an electronic-optical amplifier instead of the regular X-ray screen. The plant is organizing the production of a new dental X-ray installation.

The plant has begun the production of new voltage stabilizers which are used in automatic and telemechanical systems. Recently it produced its first consignment of those devices, which were shipped to USSR industrial enterprises and to foreign countries. One was sent to Japan; two apiece to Albania and Mongolia and three to the Democratic People's Republic of Korea. (Alma-Ata, Kazakhstanskaya Pravda, 29 Apr 58)

The Moscow Mosrentgen Plant is located in Teplyy Stan, a Moscow suburb. This enterprise produces apparatus for treating cancer with radioactive cobalt and apparatus for the fluoroscopy of metals.

The plant has shipped a GUT-SOKOO "cobalt gun" to Thailand as a gift from the Soviet Red Cross. Its products are sent to 15 different countries.

The plant has a shop for the production of atomic flaw-detection instruments, where an apparatus for the metallurgical combine in India is being produced. One of its X-ray apparatus is in operation in Mirnyy, in the Antarctic. Its products have been demonstrated at fairs in Zagreb, Izmir, and Cairo.

Asonov is chief engineer of the plant. (Moscow, Leninskoye Znamya, 30 Apr 58)

The personnel office of the Leningrad Burevestnik Plant X-ray Equipment is located at Malookhtinskiy proyezd 78, Malaya Okhta [Leningrad]. (Leningrad, Vecherniy Leningrad, 3 Dec 57)

The Orekhovo-Zuyevo Respirator Plant of the Moscow Oblast Sovnarkhoz has developed a combination anesthesia apparatus for administering ether and gas anesthetics during complex heart and lung operations.

In 1957, designers of the Division of Medical Equipment, under the leadership of Engineer B. P. Gorskiy, developed five new apparatus and submitted them for series production.

In 1958, a number of new life-saving apparatus will be developed at the plant. Designers are working on an apparatus for preventing the so-called asphyxia of newborn babies. A new type of anesthesia apparatus with an automatic system for regulating the concentration of ether vapor is being developed for use in rural hospitals. Plant designers are also developing an original universal breathing apparatus for treating paralysis in breathing. (Perm, Znamya, 9 Feb 58)

E. Photographic and Motion-Picture Apparatus

The GOMZ [State Optical Machinery Plant] needs workers for the construction of residential buildings. Applications should be made at Chugunnaya ulitsa 20 [Leningrad]. -- Advertisement (Leningrad, Vecherniy Leningrad, 20 Dec 57)

GOMZ, which recently started mass production of the Leningrad camera, has also developed other new camera models, such as the Yunost', the Neva, the Estafeta, and the Vympel.

The Estafeta (10) is a relatively simple camera for beginners and has a T-35, f:4 75-mm three-element lens and a between-the-lens four-blade shutter with speeds ranging from 1/8 to 1/250 sec and B, which is coupled to the diaphragm through an LVS system. The retractable lens barrel of this camera extends automatically when a button on the camera housing is pressed.

The Vympel (11) is essentially an improved model of the Estafeta and has a range finder with a 50-mm base which is combined with the view finder window. The shutter release button is on top of the camera housing, and it has a double-exposure prevention device.

The Neva (12) is a twin-lens reflex camera with an Industar-6, f:4, 75-mm taking lens and an f:2.8 viewing lens. It also has a between-the-lens four-blade shutter with speeds ranging from 1/8 to 1/250 sec and B with an LVS coupling to the diaphragm. (Leningrad, Optiko-Mekhanicheskaya Promyshlennost', Mar 58, pp 44-47)

(10) Photo available in source, p 45, bottom

(11) Photo available in source, p 45, upper

(12) Photo available in source, p 47

The [Leningrad] State Optical Machinery Plant (optikomekhanicheskiy zavod) has started series production of the new 35-mm Yunost' camera. (Moscow, Sovetskaya Torgovlya, 26 Jun 58)

The Kiev Arsenal [Optical Machinery] Plant has been given the name of Lenin in honor of its workers' aid in establishing Soviet rule in the Ukraine. It will now be called the Kiev Arsenal Plant imeni V. I. Lenin. (Kiev, Pravda Ukraina, 7 May 58)

Two years ago, design engineer Yevgeniy Bogdanov of Irkutsk developed a new type of camera which will accept three lenses of various focal lengths at the same time, thus making it possible to photograph a single object in three different scales [sizes] from the same place.

Bogdanov has continued to improve on his invention and has recently completed development of another design. The new model also takes three lenses simultaneously and has an optical range finder and mirror focusing. It is fitted with a special handle for cocking, aiming, and releasing the shutter. This camera weight 1,600 grams. It will soon be put into production. (Moscow, Sovetskaya Rossiya, 19 Jul 58)

It has become the practice in many stores not to permit a purchaser to test a camera for defects before paying for it. If a defect is then discovered by the purchaser, the store refuses to exchange the camera and instead advises him to send it either to the producing plant or to a guarantee workshop, which involves further expense in packaging and mailing. Such practice has aroused the indignation of photography enthusiasts. -- A. Bedrit, Sverdlovskaya Oblast (Moscow, Sovetskoye Foto, Jul 58, p 85)

Visitors at the All-Union Industrial Exposition find their attention being attracted to the new Kama 8-mm motion-picture camera (which will be produced together with the 8P-1 projector). The Kama has a spring motor, and its cassette holds 10 meters of film. (Moscow, Komsomol'skaya Pravda, 18 Jul 58)

The Leningrad Lenkinap Plant and the Central Design Bureau of the Ministry of Culture USSR have aided the Kiev Motion-Picture Studios in putting a new developing machine, KZM-5 and KZM-6 magnetic recording equipment, anamorphotic lenses, and other new equipment into operation.

The Kiev Kinodetal' and Kinap plants have developed and produced two models of the new Ukraina camera.

The Leningrad Kinap Plant and the Central Design Bureau of the Ministry of Culture designed and produced the KPZS-1 stereophonic transcription unit. (Moscow, Tekhnika Kino i Televideniya, Sep 58, pp 2, 6, & 9)

Recently, the Leningrad Lenkinap Plant supplied KZVT multichannel sound reproduction apparatus to the Progress Wide-Screen Theater in Moscow. However, because of the low quality of this apparatus, much distortion was present in its sound reproduction; this was corrected only by specialists, who had to readjust and replace certain components of the amplification unit. (Moscow, Kinomekhanik, Sep 58, p 21)

VII. ELECTRICAL PRODUCTS

A. Generators

The GRN-4, 38-volt, 1,150-ampere DC generator made by the Leningrad Elektrosila Plank is used in many USSR communications enterprises. However, it is practically impossible to obtain the rated power of this generator during continuous round-the-clock operation, and modifications must be made in it by operating enterprises in order to obtain the rated power. (Moscow, Vestnik Svyazi, Sep 58, p 28)

B. Controls

The USSR electrical industry produces very little starter-regulator equipment, and what it does produce is not always of high enough quality. Most machine building plants receive no electrical apparatus whatsoever for operational and automation needs. Much of the equipment produced, such as the PM magnetic starters, the MPK contactors, and the EP-41 intermediate relays, are on a 1930 level.

This problem should be solved by the Division of Electrical Engineering Industry and Instrument Making of Gosplan (State Planning Commission) USSR, which is in charge of the Scientific Research Institute of the Electrical Engineering Industry and other scientific organizations. -- T. Titov, Chief Power Engineer, Moscow Motor Vehicle Plant imeni Likhachev; and M. Smirnov, Chief, Electrical Engineering Laboratory (Moscow, Promyshlenno-Ekonomicheskaya Gazeta, 11 May 58)

Recently the Dnepropetrovsk Selenium Rectifier Plant shipped four control stations for the automatic control of mine elevators to the Brussels Fair. It produced a set of telemechanical control apparatus, leakage relays, and a gamma-electronic transmitter relay, which can be used for controlling mine hoppers. This apparatus will also be used for making up a number of units which will be sent to the Brussels Fair.

In recent days, the plant shipped conveyer-control relays to the international fair in Japan. (Dnepropetrovsk, Zorya, 28 Jan 58)

The [Leningrad] Elektropul't Plant produces type VUST selenium rectifiers for the power supplies of telemechanical installations. (Moscow, Elektricheskiye Stantsii, Aug 58, p 88)

T. Ye. Voroshchenko is the chief designer of the Kiev Relay and Automatics Plant. (Moscow, Promyshlenno-Ekonomicheskaya Gazeta, 14 May 58)

C. Fixtures

The Moscow Elektrosvet Plant has developed the SK-300 metal-ring shielded light fixture for schoolrooms. It is recommended that the plant put this fixture into series production, and that it distribute its blueprints and specifications among various sovnarkhozes (councils of national economy), where the production of the fixture can be undertaken locally. (Moscow, Svetotekhnika, Aug 58, p 26)

The type SK-300 light fixtures developed by the Moscow Elektrosvet Plant imeni Yablochkov have undergone illumination engineering tests in the control laboratory for mass-produced illumination engineering equipment of the VNISI [All-Union Scientific Research Illumination Engineering Institute] and have been approved for mass production at the plant. The first consignments of SK-300 fixtures will be produced during the second half of 1958. (Moscow, Svetotekhnika, Sep 58, pp 5-6)

The Academy of Municipal Services [Moscow] has an experimental plant which produces various types of equipment for municipal services, including laundry equipment. This experimental plant also does much work in the field of illumination engineering, and manufactures light fixtures. Among these fixtures are the SPOL-4-30 suspension-type street-light fixture, the ZSPL-3-80 plastic fluorescent fixture, and the SGL-3-80 ring-type fluorescent fixture.

In the past 3 years, the plant produced 17.5 million rubles' worth of commodities. In 1958, it will produce 5.5 million rubles' worth over the 1957 level.

(Source gives detailed information on the plant.) (Moscow, Zhilishchno-Kommunal'noye Khozyaystvo, Aug 58, pp 27-28)

D. Insulators

In 1957 the Leningrad Proletariy Plant failed to fulfill its plan. It is doing no better in 1958, having failed to fulfill its first-quarter and April plans.

According to I. Maksimenko, chief engineer of the plant, the main cause of nonfulfillment of plans is the plant's heavy reject rate, which amounted to more that 2 million rubles in 1957. In 1958, the reject rate continues at a rate of approximately 14-15 percent of total production.

The plant does not have adequate storage space for finished products. Its raw materials are stored in the open, where they are drenched with rain and dirtied with cinders and dust. Its leading shop, the tunnel oven shop, is crowded and cluttered with finished products. Haphazard production methods cause further rejects. Unnecessary haste in initiating

production of new products leads to waste. For 3 months, the hearth shop was producing insulators for a new air circuit breaker. Every single one of the 90 insulators it made during that time had to be rejected. This was the result of putting a product into series production without perfecting a manufacturing method for it.

The plant is forced to get along with poor-quality fuel and raw materials; this situation should be corrected by the Leningradskiy Sovnarkhoz. (Leningrad, Vecherniy Leningrad, 27 May 58)

The Gzhel' Low-Voltage Porcelain Insulator Plant (Gzhel'skiy zavod nizkovol'tnykh farforovykh izolyatorov) has been made a part of the Gzhel' Elektroizolyator Plant by the Moscow Oblast Sovnarkhoz. (Moscow, Leninskoye Znamya, 6 May 58)

E. Welding Equipment

The All-Union Scientific Research Institute of Electric Welding Equipment has developed new models of machines for the resistance welding of products made of aluminum and other highly durable light alloys.

Successful testing has been conducted on the first 1,000-kva DC pulse spot-welding machine. The pneumatic drive of this machine develops a pressure on the electrode of up to 12 tons. This unit can weld aluminum products of any shape up to 7 mm in thickness. (Leningradskaya Pravda, 27 Apr 58)

Electric welding machines made by the Leningrad Elektrik Plant (13) are in great demand in many countries. In the first quarter of 1958, 15 different countries ordered machines from this plant, including India, Yemen, Afghanistan, Mexico, Argentina, Albania, Iran, and Turkey. The machines made for India have to be specially adapted for tropical climate conditions, by using special plastics, glass, organosilicon materials, and high-durability corrosion-resistant paint. (Yerevan, Kommunist, 8 May 58)

(13) Photo showing the inspection of export-type PS-500 welding machines in a large plant building, available in source, p 1, middle

On 14 May 1958, the Vil'nyus Electric Welding Equipment Plant shipped its first consignment of new STN-500-1 welding transformers to Uglesnab [Administration for Material and Technical Supply of the Coal Industry?] in the Donbass. On the same day, it shipped a large quantity of ASB-300 electric welding units to Albania and Mongolia, and to virgin land areas. These units have attachments to adapt them for work in the field. (Vil'nyus, Sovetskaya Litva, 15 May 58)

More than a month ago, the Leninakan Electrical Engineering Plant of the Administration of Electrical Engineering Industry and Instrument Making of the Armenian Sovnarkhoz made its first products, welding transformers. In contrast to such equipment hitherto made in the USSR, the regulating unit and transformers are both incorporated into a common housing.

The plant is equipped with modern machine tools and presses, and enjoys an uninterrupted flow of the materials it needs. The plant manufactures everything it needs except for some hardware.

The transformers are series-produced on constant-flow lines. In 1958, 7,500 welding transformers should come off the assembly stand. To fulfill this assignment, the plant must work at an accelerated pace. It was supposed to have gone into operation on 1 January 1958, but did not start until 15 March. This late start resulted from the fact that the production building of the plant was destined originally for another enterprise. After the building was transferred to the electrical engineering industry, it had to be reconstructed. Much more remains to be done.

With the construction of the second stage of the plant in 1959, it will begin producing autotransformers, current transformers, and step-down and step-up transformers. -- Zh. Oganesyan, Director, Leninakan Electrical Engineering Plant (Yerevan, Kommunist, 8 May 58)

F. Other Products

In 1958, the Leningrad High-Frequency Installations Plant converted to the production of improved vacuum tube generators with powers from 8 to 200 kw for the induction heating of metals.

The plant is now increasing its production of generators for the high-frequency welding of plastics products, for joining wood in the production of furniture, and for other purposes.

This year, it is also making a new high-frequency 1,500-kw installation for the metallurgical industry. This installation will sharply cut down the consumption of tin used in the electrolytic tinning of tinplate. (Leningrad, Vecherniy Leningrad, 27 May 58)

During the 7-year plan, the Khabarovsk Amurkabel' Plant will start operating at full capacity. The plant is subordinate to the Khabarovskiy Sovnarkhoz. (Khabarovsk, Tikhookeanskaya Zvezda, 21 Feb 58)

The Cheremkhovo Elektrougli Plant and the Sverdlovsk Kinougli Plant supply particularly poor carbon for motion-picture projecters. The Sverdlovsk plant manages to produce entire lots of carbon in the form of total rejects. Even the Kudinovo Elektrougli Plant does not always produce high-quality products. (Moscow, Kinomekhanik, Sep 58, p 21)

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